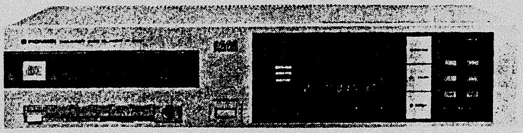
PIONEER®



Service Manual

ORDER NO.
VRT-024-0

COMPACT DISC PLAYER

P-D70

Original

HEM, HB, KU, S, S/G

MODEL P-D70 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
HEM	AC220V, 240V (switchable)	European model
HB	AC220V, 240V (switchable)	United Kingdom model
KU	AC120V only	U.S.A. model
S	AC110V, 120V, 220V, 240V (switchable)	General export model
S/G	AC110V, 120V, 220V, 240V (switchable)	U.S.A. military model

- This service manual is applicable to the HEM type.

The HB, KU, S and S/G types are the same as the HEM type with the exception of the following sections.

Contrast of Miscellaneous Parts

Mark	Symbol & description	Part No.				
		HEM	HB	KU	S	S/G
⚠	Power transformer	VTT-038	VTT-038	VTT-041	VTT-042	VTT-042
⚠	Fuse	VEK-012	VEK-012	VEK-016	VEK-013	VEK-013
⚠	Voltage selector	VSB-001	VSB-001	NO	VSB-002	VSB-002
⚠	Power cord	VDG-019	VDG-021	VDG-020	VDG-013	VDG-013
	Power cord stopper	VEC-152	VEC-152	VEC-147	VEC-147	VEC-147
	FUSB	VWR-047	VWR-047	VWR-042	VWR-054	VWR-054
⚠	L1	VTL-003	VTL-003	VTL-004	VTL-004	VTL-004
	Fuse holder	VKR-002	VKR-002	VKR-001	VKR-001	VKR-001
	Packing case	VHG-070	VHG-076	VHG-075	VHG-077	VHG-084
	Operating instructions	VRD-003	VRB-027	VRB-027	VRB-027	VRB-027
	Pick up	VWY-061	VWY-061	VWY-063	VWY-061	VWY-061

For servicing of the other types, please refer to the Additional Service Manual.

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1. DISASSEMBLY

1.1 REMOVING THE CIRCUIT BOARDS

Front panel

- Remove the 6 screws ①

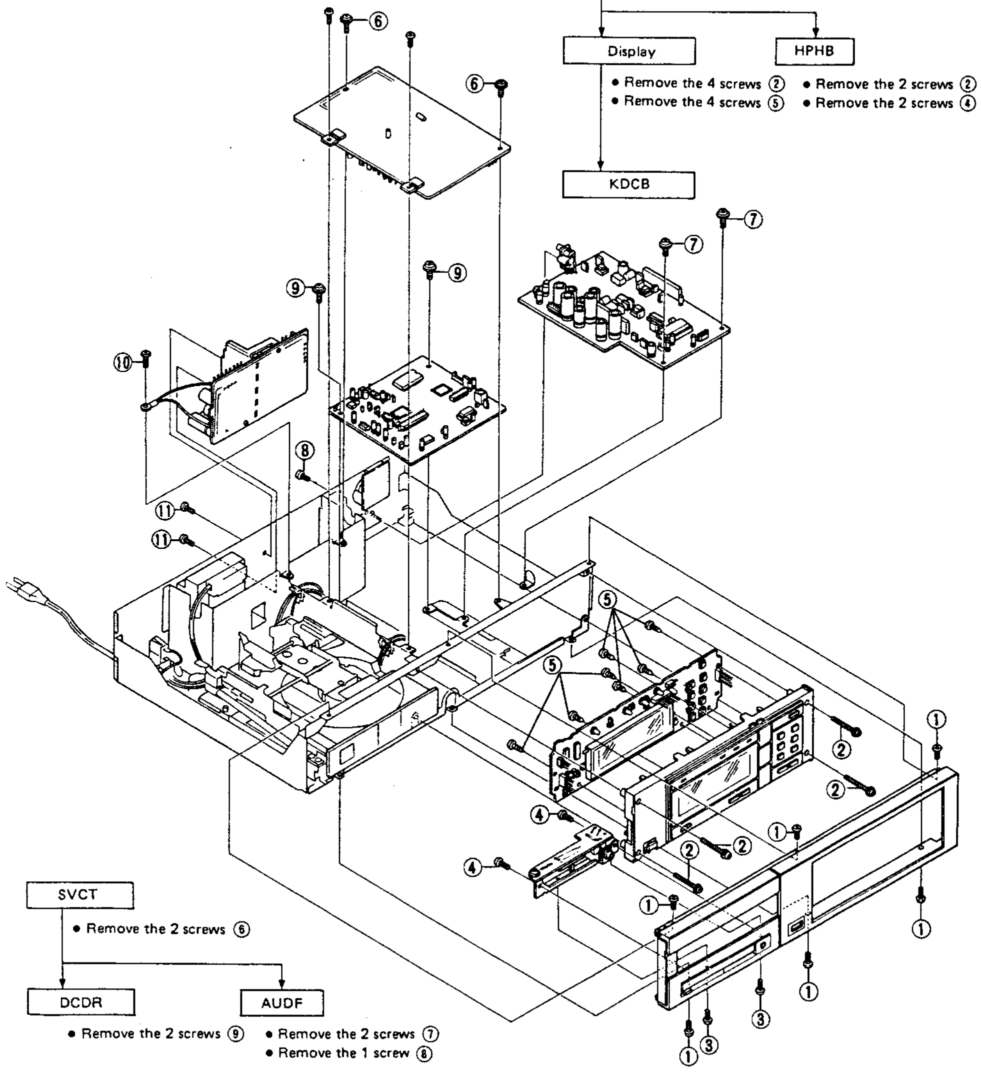
Display

- Remove the 4 screws ②
- Remove the 4 screws ⑤

HPHB

- Remove the 2 screws ②
- Remove the 2 screws ④

KDCB



SVCT

- Remove the 2 screws ⑥

DCDR

- Remove the 2 screws ⑨

AUDF

- Remove the 2 screws ⑦
- Remove the 1 screw ⑧

SYPS

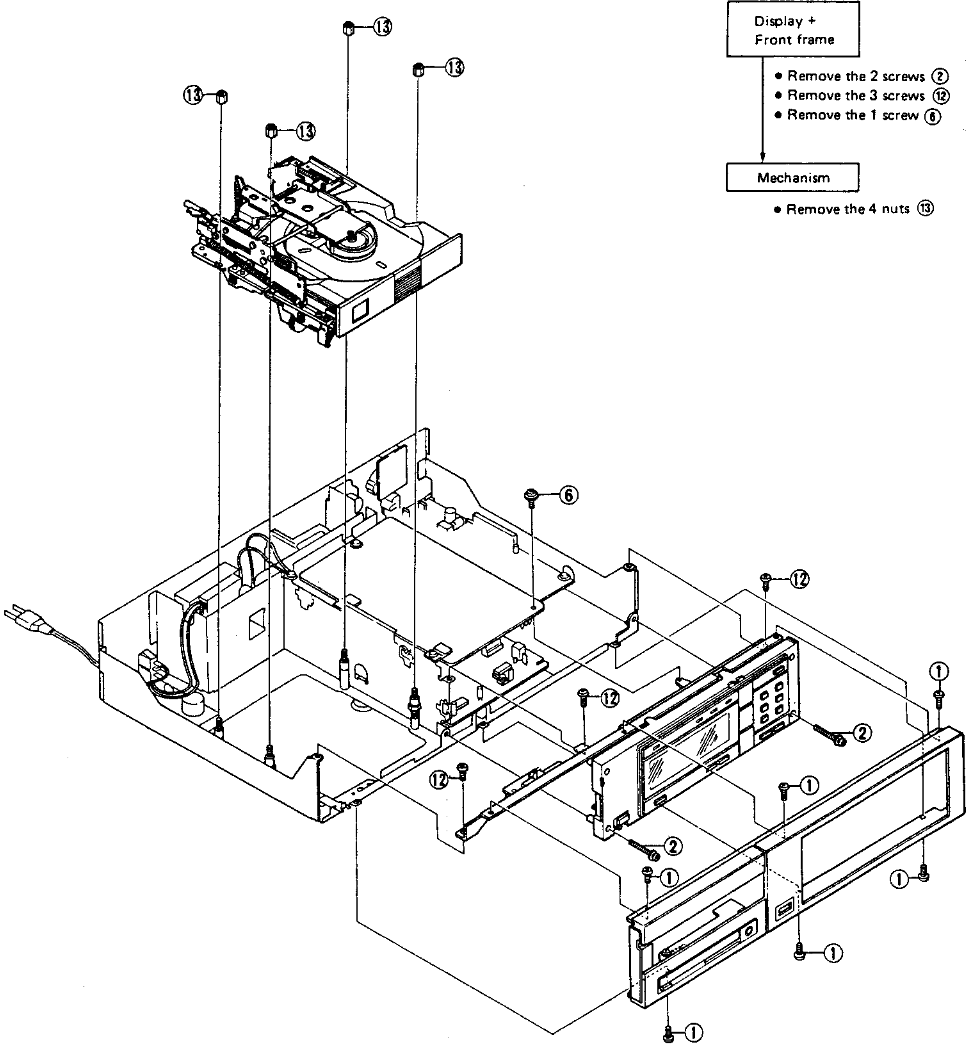
- Remove the 1 screw ⑩
- Remove the 2 screws ⑪

1.2 REMOVING THE MECHANISM

Front panel
- Remove the 6 screws ①

Display +
Front frame
- Remove the 2 screws ②
- Remove the 3 screws ⑫
- Remove the 1 screw ⑥

Mechanism
- Remove the 4 nuts ⑬

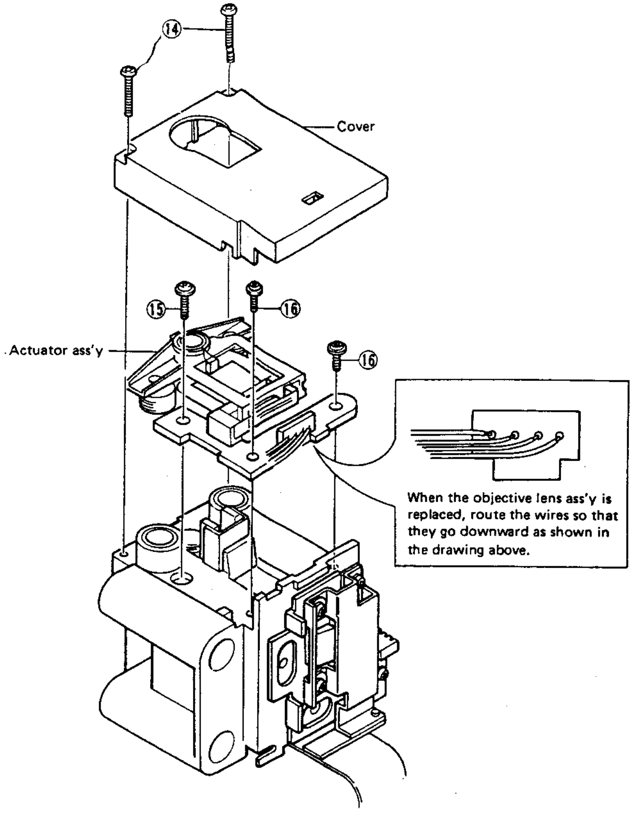

⑬
⑬
⑬
⑬
⑥
⑫
⑫
⑫
①
②
①
②
①
①
①
①

1.3 DISASSEMBLING THE PICKUP

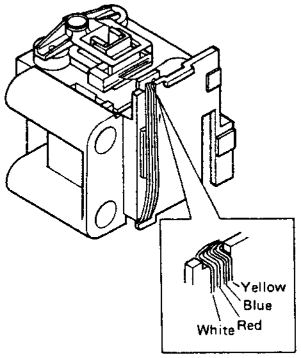
Cover
- Remove the 2 screws ⑭

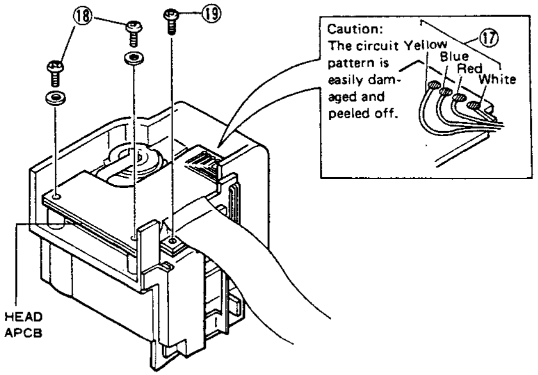
Objective
lens ass'y
- Remove the 1 screw ⑮
- Remove the 2 screws ⑯
- Solder ⑰ in 4 places

HEAD, APCB
- Remove the 2 screws ⑱
- Remove the 1 screw ⑲
- Solder ⑰ in 4 places


⑭
Cover
⑮
⑯
⑯
Actuator ass'y

When the objective lens ass'y is replaced, route the wires so that they go downward as shown in the drawing above.

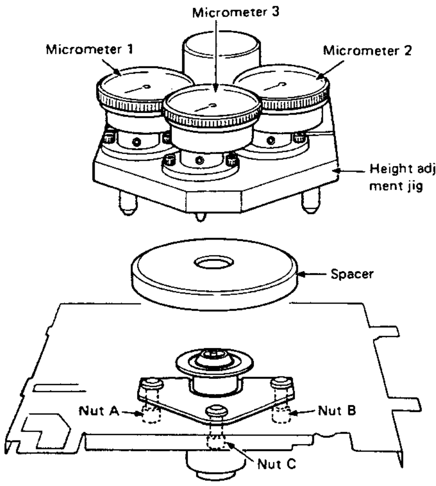

Yellow
Blue
White
Red


⑱
⑲
HEAD
APCB
⑰
Yellow
Blue
Red
White

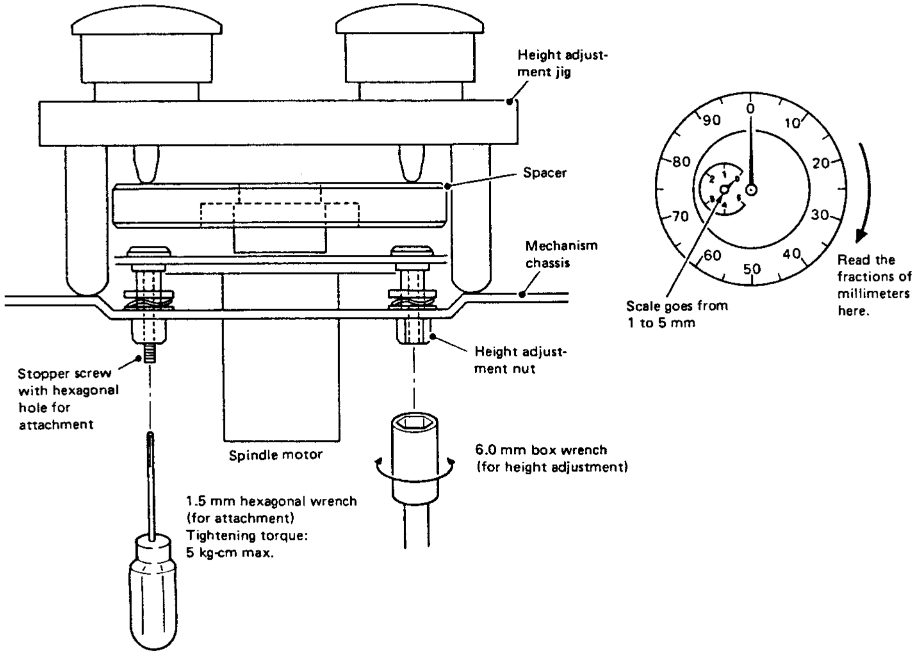
Caution:
The circuit pattern is easily damaged and peeled off.

2. MECHANICAL ADJUSTMENT

2.1 SPINDLE MOTOR HEIGHT ADJUSTMENT


Micrometer 3
Micrometer 1
Micrometer 2
Height adjust-ment jig
Spacer
Nut A
Nut B
Nut C

1) If height readjustment or motor replacement is to be performed, first loosen the stopper screws with hexagonal holes.
2) Tightening and loosening of height adjustment screws A, B and C should be performed little by little in order, A, B and C.
3) Set the height adjustment jig in place as shown.
4) Adjust height adjustment screw A until micrometer 1 reads 2.0 mm.
5) Adjust height adjustment screw B until micrometer 2 reads 2.0 mm.
6) Adjust height adjustment screw C until micrometer 3 reads 2.0 mm.
7) Tighten the three hexagonal bolts to hold height adjustment screws A, B and C in place. Then confirm that the micrometer reading is within the following tolerances:
   Micrometers 1, 2 and 3: 2.0 mm ± 0.05 mm
8) Apply screw lock to all screws.

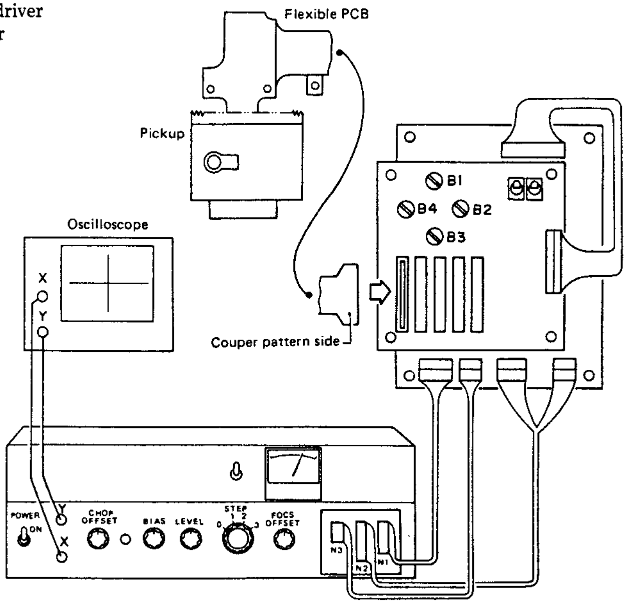

Height adjust-ment jig
Spacer
Mechanism chassis
Height adjust-ment nut
Stopper screw with hexagonal hole for attachment
Spindle motor
6.0 mm box wrench (for height adjustment)
1.5 mm hexagonal wrench (for attachment)
Tightening torque: 5 kg-cm max.
0
10
20
30
40
50
60
70
80
90
Scale goes from 1 to 5 mm
Read the fractions of millimeters here.

2.2 PICKUP ADJUSTMENTS

Connections Diagram for Pickup Adjustments

Instruments, Tools and Equipment:

- Dual trace oscilloscope (DC—35 MHz)
- Dynamic jig
- Grating adjustment screwdriver
- PD adjustment screwdriver
- Conductive mat
- Conductive wristband
- Reflection mirror jig


Flexible PCB
Pickup
Oscilloscope
X
Y
B1
B4
B2
B3
Couper pattern side
POWER
ON
Y
X
CHOP OFFSET
BIAS
LEVEL
STEP
0
1
2
3
FOCS OFFSET
N3
N2
N1

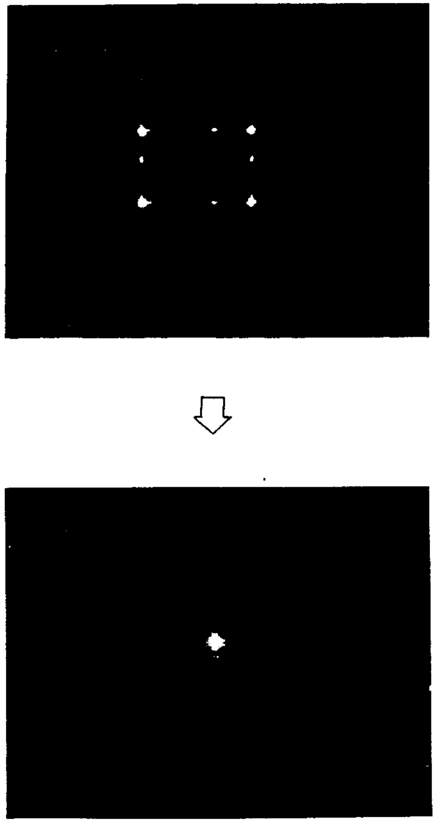
PRECAUTIONS

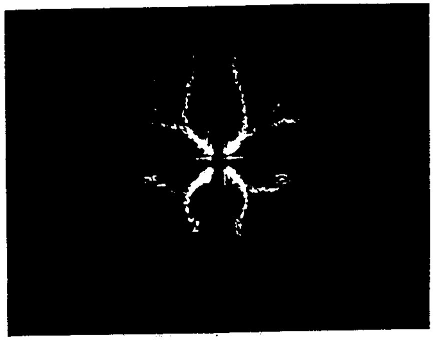
Strictly observe precautions to protect the pickup from static electricity.

- Place a conductive mat on the work bench.
- All workers should cover the ends of their sleeves with conductive covers connected to a conductive mat.
- Use a battery-powered soldering iron and ground the tip of the iron on the conductive mat. (AC 120V soldering irons with an earth connection must not be connected to the conductive mat.)
- Perform pickup replacement and adjustments only after completing the above preparations.
- Store the pickup in a conductive bag wrapped by itself.
- Do not inadvertently look at the objective lens when the laser is on.

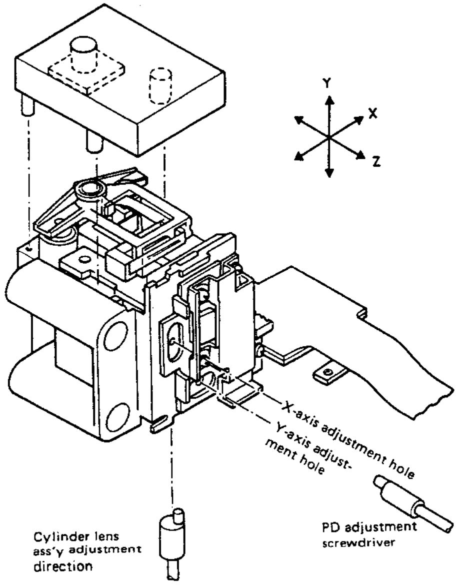
PREPARATIONS

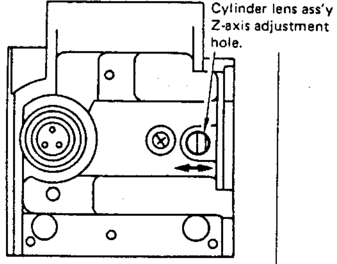
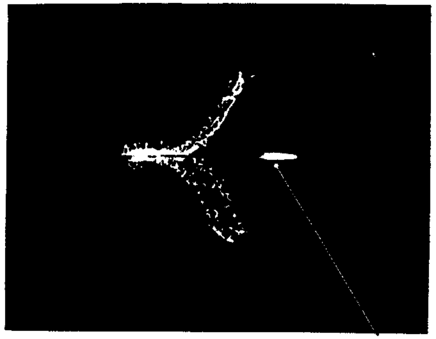
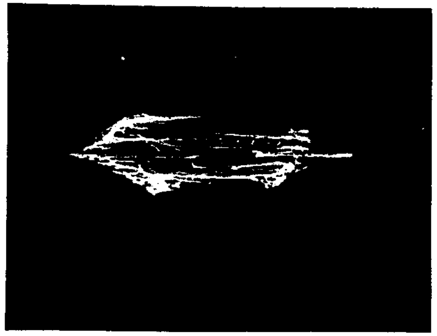
- To perform the Z-axis adjustment of the cylinder lens ass'y, first remove the actuator ass'y wiring and the HEAD/APCB ass'y screws, turn the unit upside-down and then reattach the wiring.
- Connect the dynamic jig (DY jig) and oscilloscope as shown in the diagram.
- Connect the pickup's flexible PCB to the connector of the DY jig.
- Set the oscilloscope to the X-Y mode and adjust so that the beam spot GND position is in the center of the screen.
- Turn on the DY jig power and turn on the laser.
- Turn the DY jig vibration switch on.

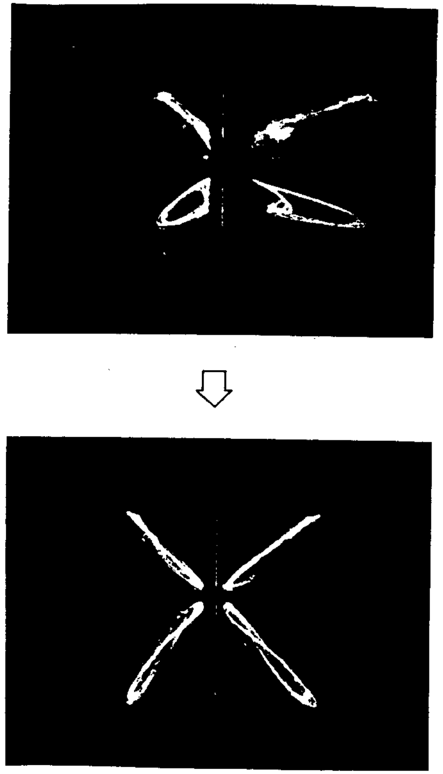
Step No.	DY jig Step SW	Oscilloscope range		Test point	Adjust-ment point	Adjustment procedure
		X	Y			
1	0	0.2V/div	0.2V/div			**ROUGH ADJUSTMENT OF PD** ● Set the step of the dynamic jig to 0. ● Using the dynamic jig CHOP OFFSET and B1, B2, B3 and B4 offset controls, bring the four beam spots on the oscilloscope screen into the center as shown. 

Step No.	DY jig Step SW	Oscilloscope range		Test point	Adjust-ment point	Adjustment procedure
		X	Y			
	0	0.2V/div	0.2V/div			● Place the reflection mirror device on the pickup as shown in the diagram. ● Using the PD adjustment screwdriver, adjust the position of PD until the waveform on the oscilloscope screen is the same as in the picture below. ● If no waveform appears, adjust the mirror device's BIAS and LEVEL controls. 

PD adjustment location

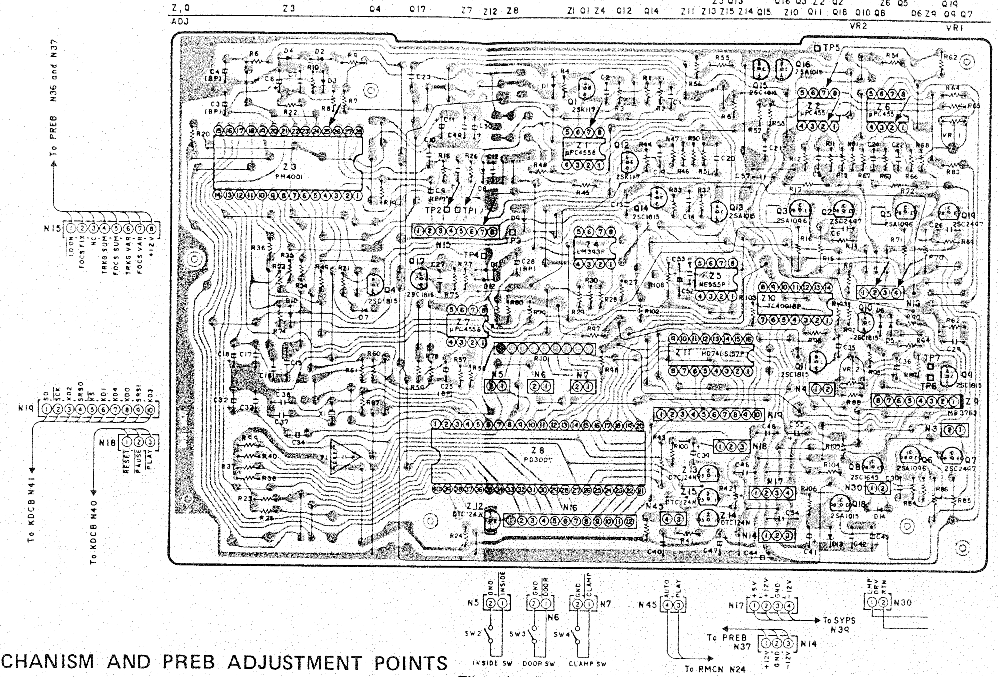

Y
X
Z
X-axis adjustment hole
Y-axis adjustment hole
PD adjustment screwdriver
Cylinder lens ass'y adjustment direction

Step No.	DY jig Step SW	Oscilloscope range		Test point	Adjust-ment point	Adjustment procedure
		X	Y			
2	1 **Cylinder lens adjustment point**  	0.2V/div	0.2V/div			**CYLINDER LENS Z-AXIS POSITION ADJUSTMENT** ● Set the step of the dynamic device to 1. ● Using the dynamic device FCS offset control, align the lissajous' waveform on the oscilloscope screen with the grand marker (vertically) as shown in the picture.  Grand marker
	2	0.2V/div	0.2V/div			● Set the step of the dynamic jig to 2. ● Confirm that the amplitude (RF level) in the horizontal direction at the grand marker (vertically) of the lissajous' waveform is at its maximum level. ● If the amplitude is not acceptable, adjust the position of the cylinder lens in the Z-axis. ● Loosen the cylinder lens attachment screw a little (do not remove the screw). ● Using the grating adjustment screwdriver, adjust the position of the cylinder so that the amplitude of the RF signal (horizontally) at the marker point (vertically) is at its maximum point. ● After finishing the adjustment, tighten the screw and confirm that there is no change in the waveform. 

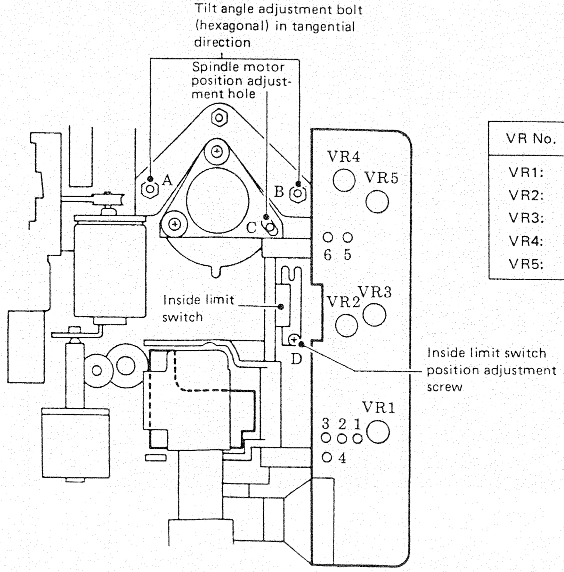
Step No.	DY jig Step SW	Oscilloscope range		Test point	Adjust-ment point	Adjustment procedure
		X	Y			
3	3	0.2V/div	0.2V/div			**PD FINE ADJUSTMENT** ● Set the step of the dynamic device to 3. ● Finely adjust the position of PD so that the lissajous' waveform is angled diagonally and so that each of the diagonal waveforms is of about the same size. ● After finishing the adjustment, tighten the screw. 

3. ELECTRICAL ADJUSTMENTS

SVCT PATTERN DIAGRAM


ADJ
VR2
VR1
To PREB N36 and N37
N15
N19
N18
To KDCB N41
To KDCB N40
N5
N6
N7
N45
N17
N30
N14
INSIDE SW
DOOR SW
CLAMP SW
To SYPS N39
To PREB N37
To RMCN N24

MECHANISM AND PREB ADJUSTMENT POINTS


Tilt angle adjustment bolt (hexagonal) in tangential direction

Spindle motor position adjustment hole

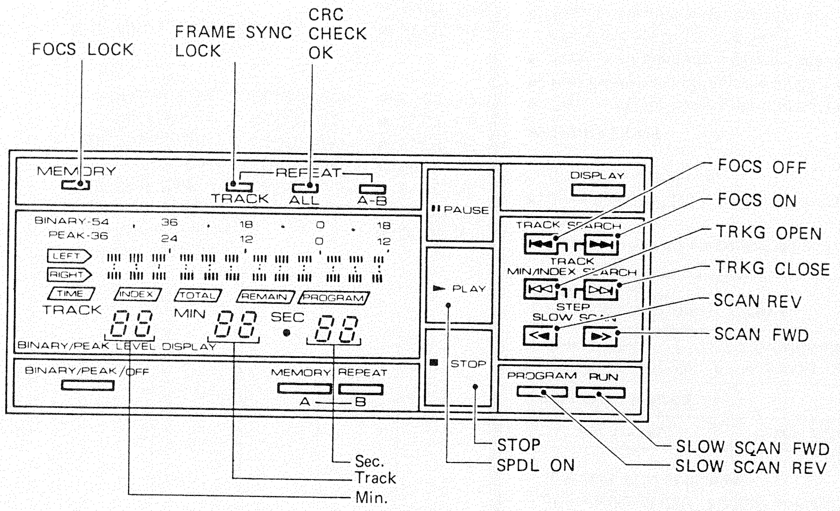
Inside limit switch

Inside limit switch position adjustment screw

A
B
C
D
VR4
VR5
6 5
VR2
VR3
VR1
3 2 1
4

VR No.	
VR1:	RF LEVEL
VR2:	FOCUS OFFSET
VR3:	FOCUS GAIN
VR4:	TRKG BAL
VR5:	TRKG GAIN

KEY FUNCTIONS WHEN TEST CPU IS ATTACHED


FOCS LOCK
FRAME SYNC LOCK
CRC CHECK OK
MEMORY
REPEAT
TRACK
ALL
A-B
PAUSE
DISPLAY
BINARY-54
PEAK-36
LEFT
RIGHT
TIME
INDEX
TOTAL
REMAIN
PROGRAM
TRACK
MIN
SEC
BINARY/PEAK LEVEL DISPLAY
PLAY
STOP
TRACK SEARCH
TRACK MIN/INDEX SEARCH
STEP SLOW SCAN
BINARY/PEAK/OFF
MEMORY REPEAT
A — B
PROGRAM
RUN
FOCS OFF
FOCS ON
TRKG OPEN
TRKG CLOSE
SCAN REV
SCAN FWD
SLOW SCAN FWD
SLOW SCAN REV
STOP
SPDL ON
Sec.
Track
Min.

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure

INSTRUMENTS AND DEVICES USED

- Dual trace oscilloscope with time delay sweep
- Light power meter
- Test disc YEDS-7 and Demonstration disc
- FTG adjuster
- Test CPU
- Post (for mechanism ass'y hold)
- Grating screwdriver
- 2-shaft screwdriver (for adjustment of wire connection angle)

PRECAUTIONS

- A 1:1 probe should be used with the oscilloscope.
- All waveform photos are on a 35 MHz band oscilloscope.
- Do not look at the objective lens when the laser is on.
- TP is on SVCT board unless otherwise specified.
- VR is on PREB board unless otherwise specified.
- The spindle motor height should be adjusted beforehand.
- The adjustment specifications listed here assume the use of a test CPU. When the test CPU is used instead of the standard CPU (PD3007 or PD3014), the player functions differ as follows.

With test CPU	With standard CPU
FOCUS ON, SPDL ON	–
FOCUS ON, SPDL ON (TRKG OPEN)	SVCT TP3 is connected to -5V when play is started
FOCUS ON, SPDL ON TRKG CLOSE	Play on

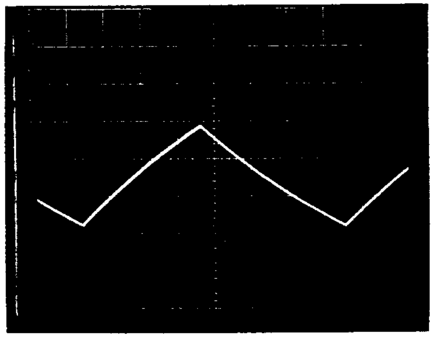
- Steps 4, 5, 6 and 7 are performed with the TRKG loop open.
- Steps 8, 9, 10, 11, 12, 13 and 14 are performed with the TRKG loop closed.

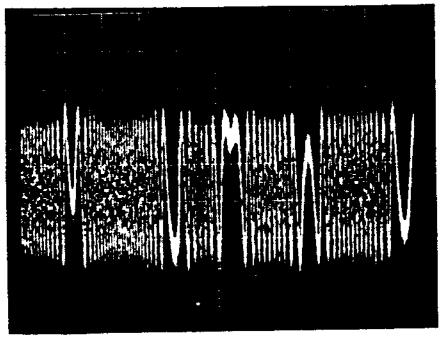
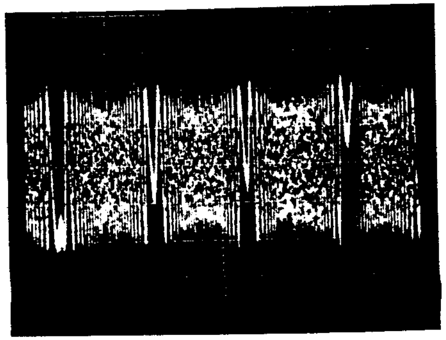
PREPARATIONS

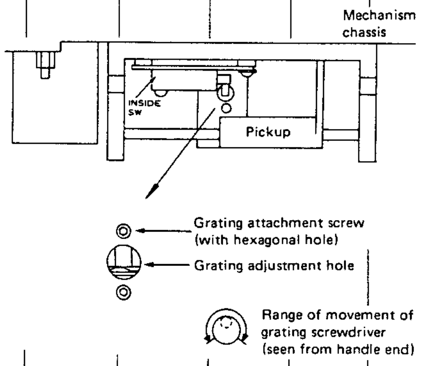
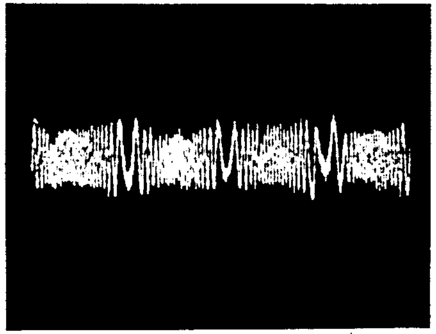
- Remove the top cover and bottom panel.
- Replace the CPU (Z8) on the SVCT with the test CPU.
- Remove the connectors between the mechanism ass'y PREB and the DCDR and SVCT.
- Remove the mechanism from the unit (remove the four nuts) and put the four posts in place. Refer to the mechanism ass'y removal procedure for details.
- Replace the connectors as they were before. Follow directions in the chart to the left and be sure each connector is firmly inserted.

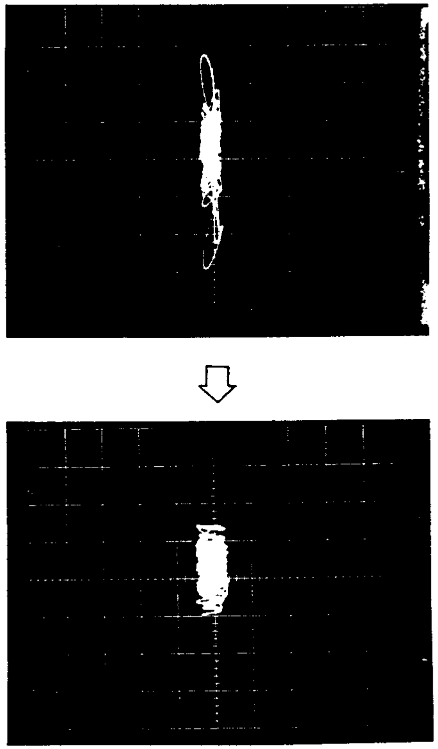
Mechanism ass'y
2P (White shield wire) ➡ DCDR N10
2P (Red, Black : SPDL motor) ➡ DCDR N2
2P (Red, Black : CARG motor) ➡ SVCT N3
2P (Yellow, Black : LOAD motor) ➡ SVCT N4
2P (Green, Red : INSIDE SW) ➡ SVCT N5
2P (Blue, Black : DOOR SW) ➡ SVCT N6
2P (Perple, Black : CLAMP SW) ➡ SVCT N7

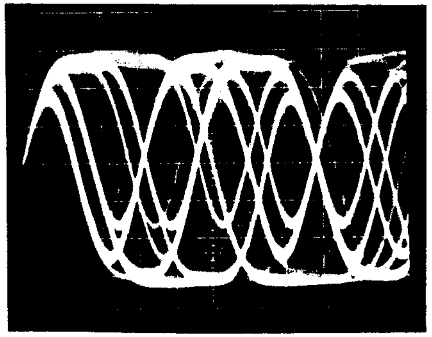
PREB
3P (White, Black, Brown) ➡ SVCT N14
8P ➡ SVCT N15
4P ➡ SVCT N13

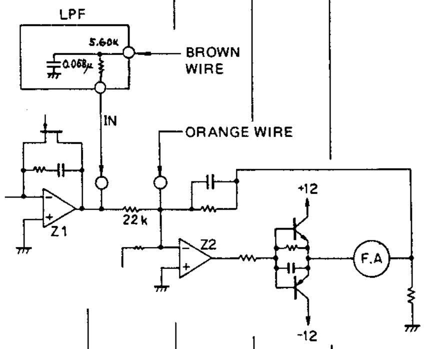
Step No.	Oscilloscope		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
			Unless otherwise specified, TP is on SVCT	Unless otherwise specified, VR is on PREB		**GENERAL ADJUSTMENTS**
1	0.1V/div 10mV/div	1mS/div	N13-2 N13-4	SVCT VR1	(F return) 0V±100mV (T return) 0V±10mV	**CHECK OF FOCUS, TRKG RETURN VOLTAGE** ● Turn on the power and confirm that the focus return voltage is 0 V ± 100 mV and that the tracking return voltage is 0 V ± 10 mV. ● If the tracking return voltage is not acceptable, correct by adjusting SVCT VR1 (tracking offset). ● If the focus return voltage is not acceptable, check SVCT Z1, Z2, Q2 and Q3. **Note:** If the return voltage is not within the acceptable range, correct promptly because it could cause the actuator coil to fail.
	0.1V/div	1mS/div	N15-7	VR2	0V±0.1V	● Measure the DC voltage at N15-7. If it is not acceptable, correct by adjusting VR2.
2	0.5V/div	0.2S/div	N13-2	–	Ramp waveform	**CHECK OF RAMP WAVEFORM** ● Press FOCUS ON (▶▶|) and confirm that the objective lens goes up and down. (Ramp waveform at N13-2) 
3	–	–	–	APCB VR1	0.26mW ±0.02mW	**CHECK OF LD POWER** ● Place the light power meter sensor directly over the objective lens and confirm that the LD power is acceptable. ● If the power is not acceptable, correct by adjusting the VR of APCB.

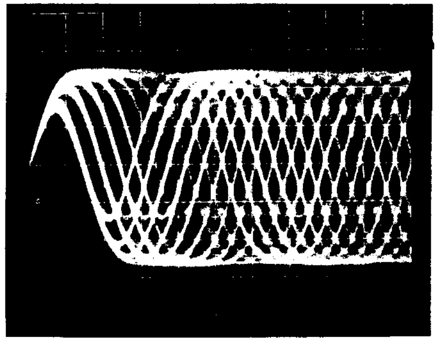
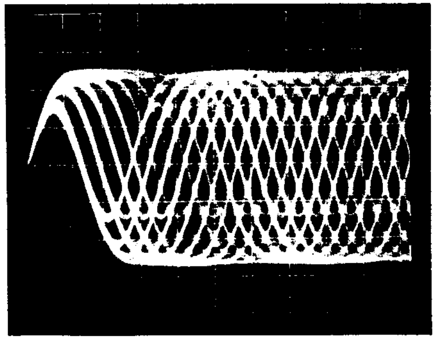
Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
4	1V/div 2V/div	0.2S/div	N13-2 SVCT Z3 25		Ramp waveform $\overline{\text{FOCUS}}$ $\overline{\text{LOCK}}$	**CHECK OF FOCUS AND SPINDLE LOCKS** ● Press the stop button and load the demonstration disc. ● Press FOCUS ON (▶▶|) and confirm that one Ramp waveform cycle is generated at N13-2 and that a negative voltage is generated at SVCT Z3 25 ($\overline{\text{focus lock}}$). ● Press SPDL ON (▶) and confirm that the disc spins and that the disc does not begin to spin out of control.
5	0.5V/div	5mS/div	TP-2	VR4 (TRKG BAL)	|A – B| < 0.1V	**TRACKING BALANCE** ● Measure the tracking error at TP-2 and adjust to eliminate any DC element.  ⇩ 

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
6						**GRATING ADJUSTMENT** ● Use the disc "38DC15", SONY. ● Press SCAN FWD (▶▶) to move the pickup toward the outer edge of the disc and stop the pickup at a point where the pickup grating adjustment hole is slightly beyond the inside limit switch.
	0.2V/div	5mS/div	TP-2	VR5	2.0Vp-p	● Roughly adjust VR5 (tracking gain) so that the tracking error is 2.0Vp-p.
	0.2V/div	5mS/div	TP-2	VR4	|A - B| < 0.1V	● Confirm that there is no DC element in the tracking error. If DC exists, fine adjust VR4.
	0.2V/div	5mS/div	TP-2	Grating	Null point	● Loosen the grating attachment screws. ● Insert the grating screwdriver in the grating hole with the cam section of the tip pointing upward. ● Rotate the grating screwdriver to the point where the tracking error is at its minimum level and the envelope is as clean as possible (null point). If it is difficult to find the null point, check by inserting an LPF (cutoff: about 4 kHz) between TP-2 and the probe. **Note:** The grating screwdriver can only be rotated over a range of about 300°. Do not try to forcibly rotate it any farther.
	 Mechanism chassis INSIDE SW Pickup Grating attachment screw (with hexagonal hole) Grating adjustment hole Range of movement of grating screwdriver (seen from handle end)					
	0.2V/div	5mS/div	TP-2	Grating	Max. amplitude	● Now rotate the screwdriver clockwise from its present position to the point where the tracking error amplitude is at its highest point. ● While measuring the tracking error, tighten the attachment screws. After tightening the screws, confirm that the tracking error amplitude is still at its maximum level.

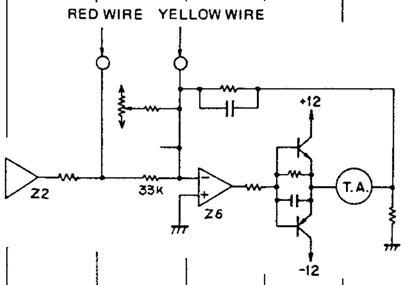
Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
	X: 0.1V/div Y: 20mV/div		X: TP-2 Y: TP-1	Grating	Min. on Y-axis	● Set the oscilloscope to the X-Y mode, perform AC coupling and observe the TRKG SUM and TRKG VAL lissajous' waveforms. ● Fine adjust the grating so that the lissajous' waveform amplitude in the vertical direction is at its lowest level. ● Next, press SCAN REV (◀◀) to move the pickup toward the center of the disc to the point just before the pickup pushes against the inside switch.
			X: TP-2 Y: TP-1	SPDL Motor holder	Min. on Y-axis	● Check the lissajous' waveform. If it is not the same as the lissajous' waveform for the outer edge of the disc, adjust the position of the spindle motor. 

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
7	X: 0.1V/div Y: 20mV/div		X: TP-2 Y: TP-1	SPDL Motor position adjustment hole	Min. on Y-axis	**SPINDLE MOTOR POSITION ADJUSTMENT** ● Remove spindle motor attachment screw C (mechanism adjustment point in section 3-1) and insert the spindle motor position adjustment screwdriver in the screw hole. ● Rotate the screwdriver to the point where the lissajous' waveform is at its lowest level in the vertical direction. ● Check the waveforms at the inner and outer tracks of the disc. If either is not correct, repeat the spindle motor position adjustment. ● After finishing the adjustment, replace the screw and apply screw lock.
8						**SPINDLE MOTOR HORIZONTAL ADJUSTMENT IN TANGENTIAL DIRECTION** ● Press the stop button once and attach the 2-shaft screwdriver. ● Press the FOCUS ON (►►|), SPDL ON (►) and TRKG CLOSE (▷▷|) buttons in succession.
	50mV/div	0.5μs/div	DCDR C1 ⊕		Flatten the tops of the RF waveform	● Roughly adjust VR2 (FOCUS OFFSET) so that the RF waveform eye pattern is at its highest level.
			DCDR C1 ⊕	Angle adjustment hexagonal bolt	Maximum eye pattern	● Rotate the 2-shaft screwdriver to the point where the tops of the peaks of the RF waveform are flat at the innermost tracks of the disc. ● After finishing the adjustment, observe the RF waveform for between-songs tracks in the center and outer section of the disc to confirm that the peaks at these locations are also flat. 

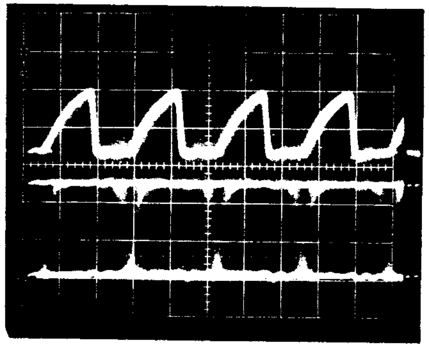
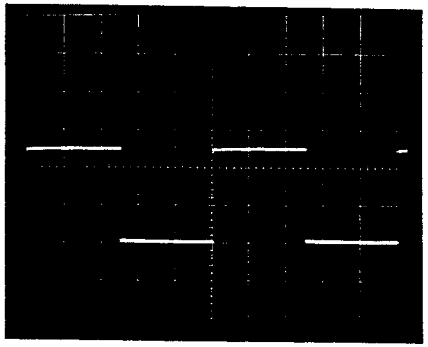
Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
9						**INSIDE LIMIT SWITCH POSITION ADJUSTMENT** ● Stop the player and load test disc YEDS-7. ● Press SCAN FWD (►>) to move the pickup toward the outer edge of the disc, then press stop and wait until the pickup stops returning. Finally, press FOCUS ON (►►|), SPDL ON (►) and TRKG C/L (▷▷|) in succession.
				Inside SW	Track 0 4 min. 10 sec.	● Confirm that the display reads track 0, 4 min. 10 sec. ± 10 sec. If the display is not correct, press stop and readjust the position of the inside switch.
10						**FOCUS GAIN ADJUSTMENT** ● Set frequency of the FTG adjuster at 500 Hz with Frequency-VR1. ● Set the gain of the FTG adjuster at 50 mVp-p with Gain-VR1. Oscilator's output is available from Orange wire by turning the Switch to 1. ● Connect the Orange wire of the FTG adjuster as shown in the diagram.
	X: 10mV/div Y: 20mV/div		Z2 2 Z1 7	VR3	J-LED ON	● Connect the LPF (5.60 k/0.068μF) between Z1 output and the brown wire of the FTG adjuster. ● Adjust VR3 to turn on the green j (JUST) LED. ● Disconnect the FTG adjuster.
	 LPF 5.60K 0.068μ BROWN WIRE IN ORANGE WIRE 22k Z1 Z2 +12 -12 F.A					

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
11	0.1V/div	0.5μs/div	DCDR C1 ⊕	VR2	Max. eye pattern	**FOCUS OFFSET ADJUSTMENT** ● Observe the RF waveform during the second track. ● Fine adjust VR2 (FOCUS OFFSET) so that the eye pattern aperture is at its maximum. 
	0.1V/div	0.5μs/div	N15-7	VR2	Within ±0.1 V	● Press stop and confirm that the DC voltage at N15-7 is 0 V ±0.1 V. If the voltage is not correct, fine adjust VR2 to bring to either +0.1 V or -0.1 V, whichever is closest.
12	0.1V/div	0.5μs/div	DCDR C1 ⊕	VR1	0.5 V ±0.05 V	**RF LEVEL ADJUSTMENT** ● Observe the RF waveform during the second track. ● Adjust VR1 (RF level) so that the amplitude of the RF waveform is 0.5 V ±0.05 V. 

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
13	X: 20mV/div Y: 0.2V/div		Z6 ② Z2 ⑦	VR5	J–LED ON	***TRACKING GAIN ADJUSTMENT*** ● Set the frequency of the FTG adjuster at 1.35 kHz with Frequency-VR2. ● Set the gain of the FTG adjuster at 30 mVp-p with Gain-VR2. Oscillator's output is available from Yellow wire by turning the Switch to 2. ● Connect the Yellow wire of the FTG adjuster as shown in the diagram. ● Connect red wire of the FTG adjuster as shown in the diagram. ● Adjust VR5 to turn J-LED on.



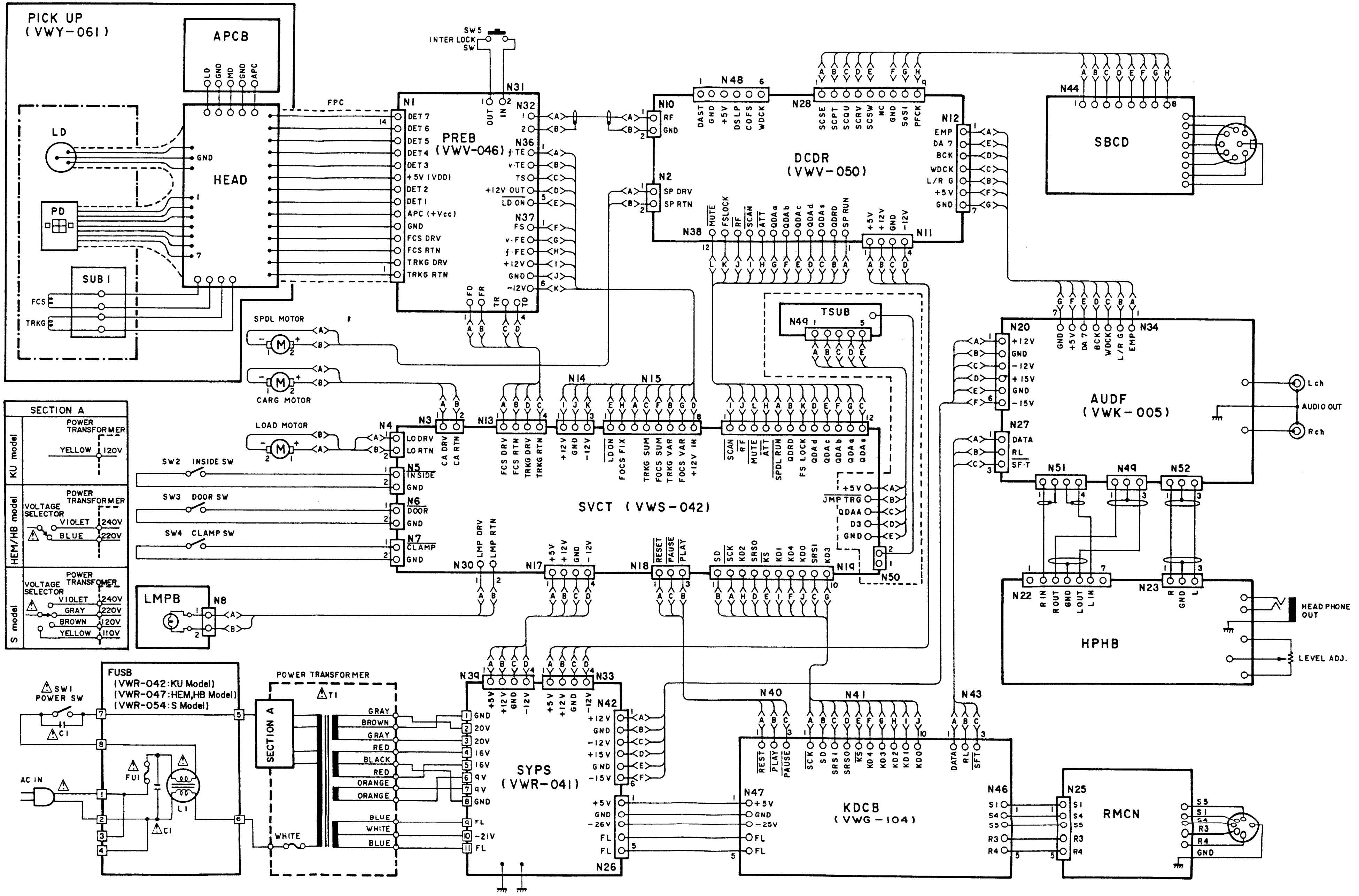
Step No.	Oscilloscope range		Test point	Adjustment point	Check point/ Adjustment specifications	Adjustment procedure
14						**SPINDLE MOTOR RADIAL ANGLE CONFIRMATION** ● Perform DC coupling for channel 1 of the oscilloscope and AC coupling for channel 2, reverse the polarity and set both channels 1 and 2 to ADD. ● Connect both channels 1 and 2 to N13-2.
	50mV/div	1mS/div	N13-2	SPDL motor height adjustment bolt	DC -200mV ±100mV	● Check the DC voltage at the innermost and outermost tracks of the disc. Correct value: -200 mV ± 100 mV
						● The difference between the two DC voltages obtained in the above step should not be more than 50 mV. ● If the difference is larger, readjust the spindle motor height (angle).
						After completing all of the above steps: ● Replace the test CPU with the original PD3007, or PD3014 type. ● Replace the mechanism ass'y in the player.

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
						DCDR PANEL
	2V/div 2V/div	0.1 µs/div	DCDR Z3 ⑫ (PLCK) Z3 ⑭ (EFM2)	DCDR VR1	See photo	**PLL OFFSET** ● Load the YEDS-7 test disc and press the play button. ● Observe the PLCK and EFM2 waveforms. (Apply the trigger for PLCK.) (The upper photo shows the PLCK waveform and the lower photo shows the EFM2.) ● Align the edge of the PLCK rise with the EFM2 jitter. 
	2V/div	20µs/div	DCDR Z1 ⑲ (APCO)	DCDR VR2	Duty 50%	**SPDL OFFSET** ● Observe APCO and adjust so the duty ratio is 50%. 

Step No.	Oscilloscope range		Test point	Adjustment point	Check points/ Adjustment specifications	Adjustment procedure
				VR3		**BRAKE PULSE ADJUSTMENT** ● Load the demonstration disc and press the play button. ● Press the stop button while playing the first track and measure the time required for the disc to come to a full stop on its own in the clockwise direction. ● Press the stop button while playing the last track and measure the time required for the disc to come to a full stop on its own in the counterclockwise direction. ● The stopping time should be about the same for both the first and last tracks. ● If the stopping times differ significantly, adjust VR3.
	2V/div	1mS/div	DCDR R42//C17	VL1	5V±0.2V	**VCO ADJUSTMENT** ● While playing a disc, measure the DC voltage at the point between DCDR R42 and C17 to confirm that it is 5V ±0.2V. ● If the voltage is not acceptable, adjust VL1.
						SVCT PANEL
			SVCT TP-7 TP-6	SVCT VR2	0.3±0.05V	**LOADING STOP ADJUSTMENT** ● Press the OPEN/CLOSE button to eject the disc. ● Press the OPEN/CLOSE button again and, while the loading motor is rotating (while the disc table is closing), adjust VR2 so that the voltage drop between TP-7 and TP-6 is 0.3V ±0.05V. ● After finishing adjustments, block the disc table loading movement (when the table is moving inward) and confirm that the loading motor stops rotating.
						AUDF PANEL
	10mV/div 10mV/div	1mS/div 1mS/div	AUDF TP-1 TP-2	AUDF VR1 VR2	0V±10mV 0V±10mV	**OFFSET ADJUSTMENT** ● Turn on the power and adjust so that the DC voltage at TP-1 is 0V ±10mV. ● Adjust so that the DC voltage at TP-2 is 0V ±10mV.

4. SCHEMATIC DIAGRAM, PCB PATTERNS, & PARTS LIST

4.1 OVERALL CONNECTION DIAGRAM


PICK UP (VWY-061)
APCB
LD
PD
HEAD
SUB I
FCS
TRKG
FPC
PREB (VWV-046)
N1
N31
N32
N36
N37
SW5 INTER LOCK SW
DCDR (VWV-050)
N10
N2
N48
N28
N12
N38
N11
SBCD
N44
SPDL MOTOR
CARG MOTOR
LOAD MOTOR
SW2 INSIDE SW
SW3 DOOR SW
SW4 CLAMP SW
SVCT (VWS-042)
N3
N4
N5
N6
N7
N13
N14
N15
N17
N18
N19
N30
N50
TSUB
N49
LMPB
N8
AUDF (VWK-005)
N20
N27
N34
N51
N52
Lch
Rch
AUDIO OUT
HPHB
N22
N23
HEAD PHONE OUT
LEVEL ADJ.
SECTION A
KU model
HEM/HB model
S model
POWER TRANSFORMER
VOLTAGE SELECTOR
YELLOW 120V
VIOLET 240V
BLUE 220V
GRAY 220V
BROWN 120V
YELLOW 110V
FUSB (VWR-042: KU Model) (VWR-047: HEM, HB Model) (VWR-054: S Model)
SW1 POWER SW
C1
FU1
L1
AC IN
T1
SYPS (VWR-041)
N39
N33
N42
N26
KDCB (VWG-104)
N40
N41
N43
N46
N47
RMCN
N25
S5
S1
S4
R3
R4
GND

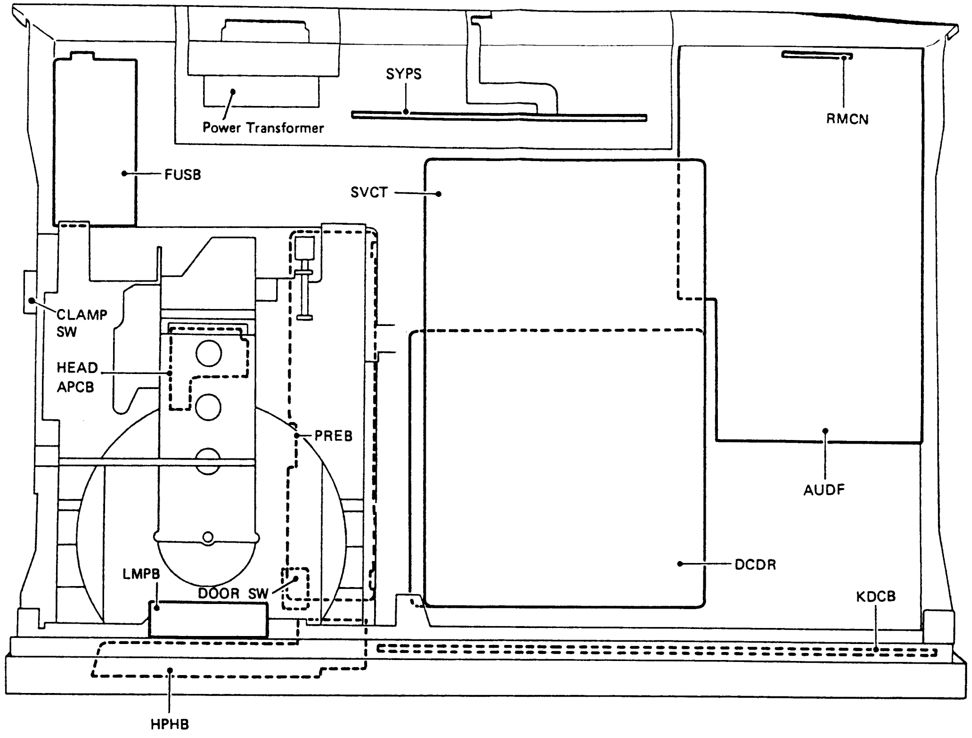
Miscellaneous Parts List

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

P-D70/HEM Parts list 1

(MK)	(Part No.)	(IT)(REF Nos. & DESCRIPTIONS)
	VWR-041	SYPS
	VWR-047	FUSB
	VWV-046	PREB
	VWS-042	SVCT
	VWV-050	DCDR
	VWK-005	AUDF
	VWG-104	KDCB
		TSUB
		HPHB
		LMPB
	VWY-047	iNTB
		RMCN
	VWY-061	Pickup
⚠	VTT-038	Power transformer
⚠	VSA-006	SW 1 Power switch
⚠	VCG-018	Capacitor
	VEK-012	FU1 250mA
	VSF-009	SW2-4
	VXM-032	CARG Motor
	VXM-033	SPDL Motor
	VXM-034	Loading motor
⚠	VSA-001	Voltage selector
⚠	VDG-019	Power cord

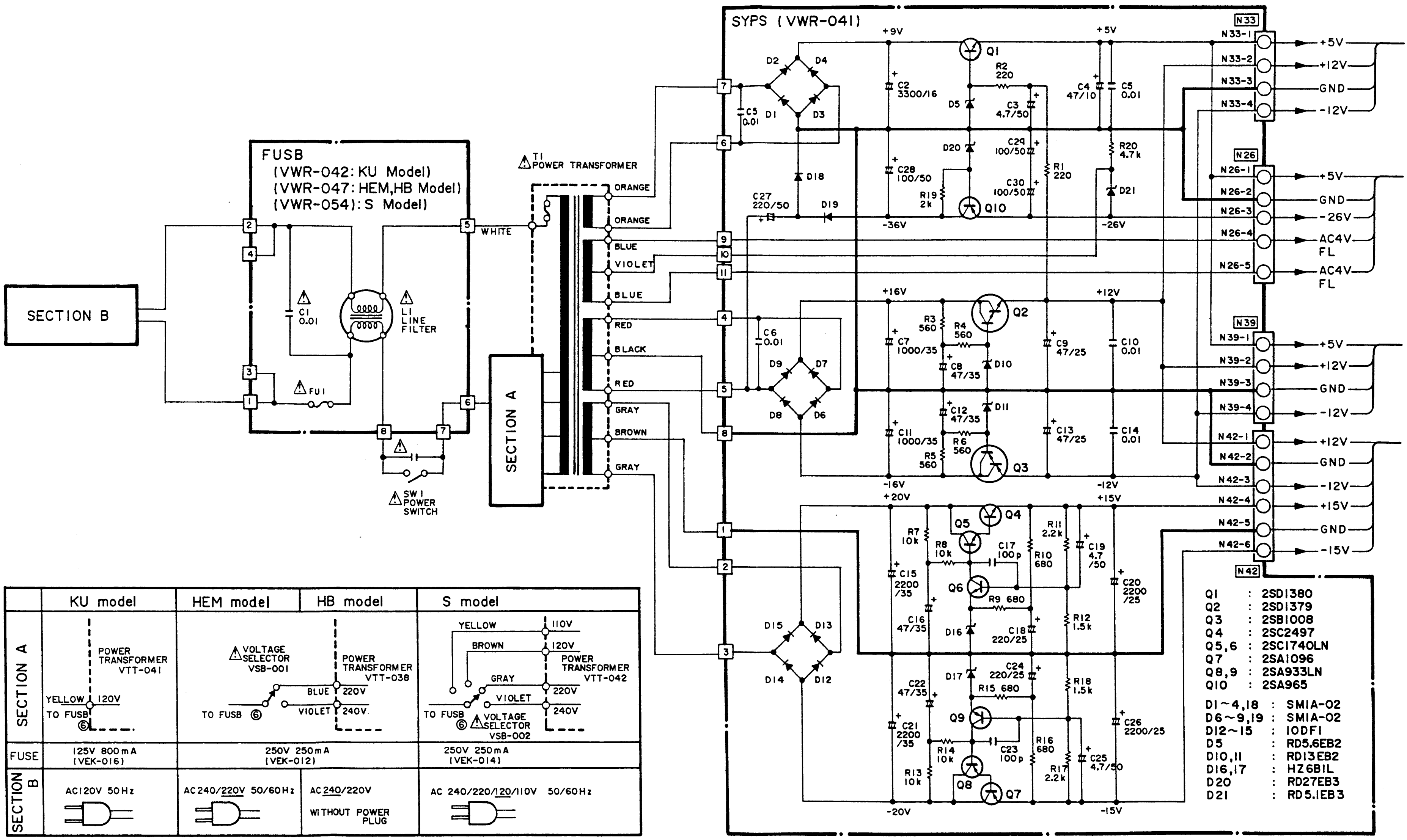
4.2 LOCATION OF PCBS



Abbreviation List

FUSB	Fuse board
SYPS	System power supply
HEAD	Head amp.
APCB	Automatic laser power control board
PREB	Pre-processing board
SVCT	Servo & control board
DCDR	Decoder board
AUDF	Audio & filter board
HPHB	Headphone board
LMPB	Lamp board
KDCB	Key, display, & control board
RMCN	Remote control board

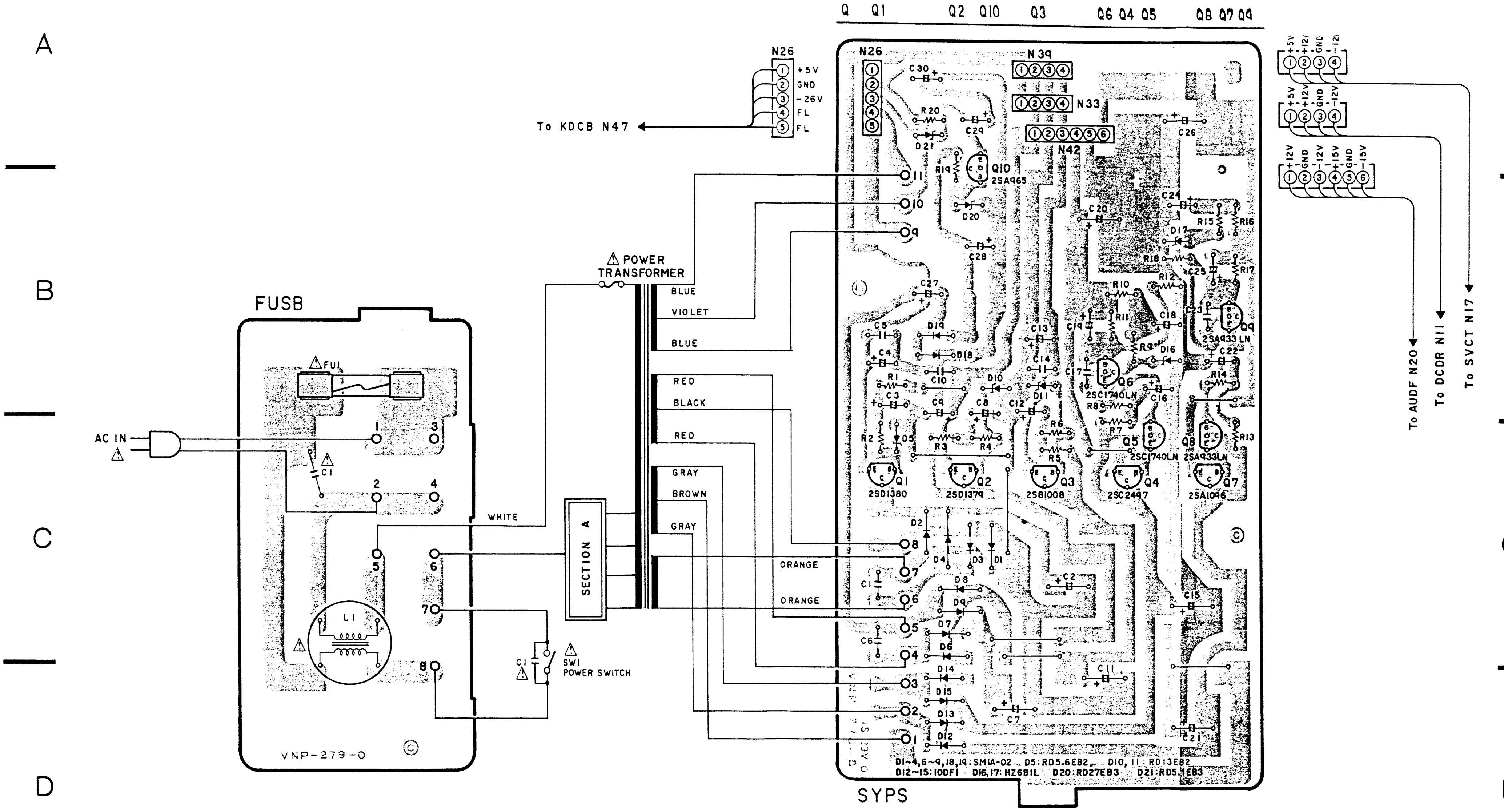
4.3 FUSB, SYPS


SYPS (VWR-041)
FUSB
(VWR-042: KU Model)
(VWR-047: HEM,HB Model)
(VWR-054): S Model)
SECTION B
SECTION A
T1 POWER TRANSFORMER
C1 0.01
L1 LINE FILTER
FU1
SW1 POWER SWITCH
WHITE
ORANGE
ORANGE
BLUE
VIOLET
BLUE
RED
BLACK
RED
GRAY
BROWN
GRAY
+9V
+5V
-36V
-26V
+16V
+12V
-16V
-12V
+20V
+15V
-20V
-15V
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
C2 3300/16
C3 4.7/50
C4 47/10
C5 0.01
C5 0.01
C6 0.01
C7 1000/35
C8 47/35
C9 47/25
C10 0.01
C11 1000/35
C12 47/35
C13 47/25
C14 0.01
C15 2200/35
C16 47/35
C17 100p
C18 220/25
C19 4.7/50
C20 2200/25
C21 2200/35
C22 47/35
C23 100p
C24 220/25
C25 4.7/50
C26 2200/25
C27 220/50
C28 100/50
C29 100/50
C30 100/50
R1 220
R2 220
R3 560
R4 560
R5 560
R6 560
R7 10k
R8 10k
R9 680
R10 680
R11 2.2k
R12 1.5k
R13 10k
R14 10k
R15 680
R16 680
R17 2.2k
R18 1.5k
R19 2k
R20 4.7k
N33
N33-1
N33-2
N33-3
N33-4
+5V
+12V
GND
-12V
DCDR N11
N26
N26-1
N26-2
N26-3
N26-4
N26-5
+5V
GND
-26V
AC4V FL
AC4V FL
KDCB N47
N39
N39-1
N39-2
N39-3
N39-4
+5V
+12V
GND
-12V
SVCT N17
N42
N42-1
N42-2
N42-3
N42-4
N42-5
N42-6
+12V
GND
-12V
+15V
GND
-15V
AUDF N20

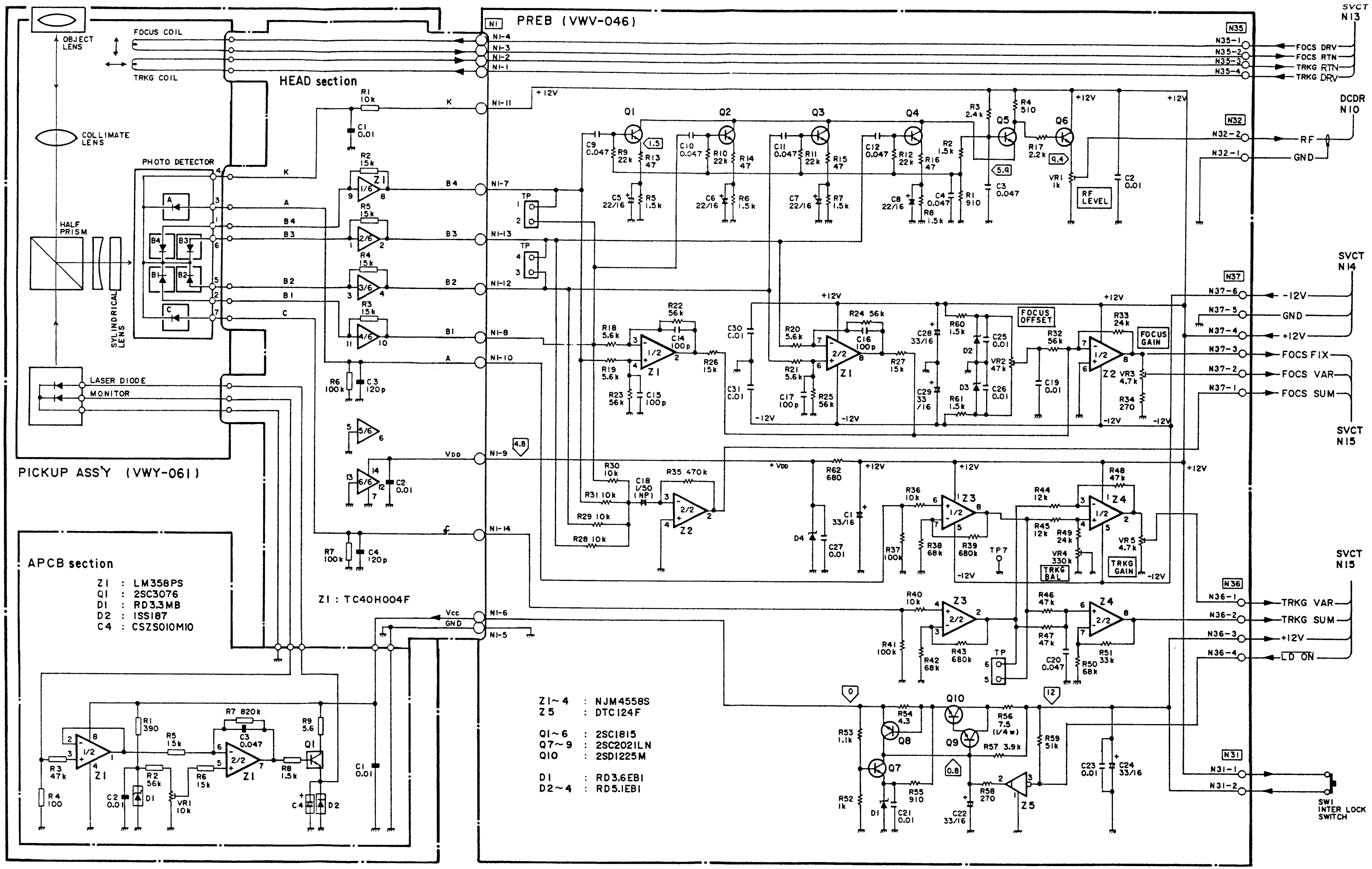
	KU model	HEM model	HB model	S model
SECTION A	POWER TRANSFORMER VTT-041 YELLOW 120V TO FUSB ⑥	VOLTAGE SELECTOR VSB-001 POWER TRANSFORMER VTT-038 BLUE 220V VIOLET 240V TO FUSB ⑥		YELLOW 110V BROWN 120V POWER TRANSFORMER VTT-042 GRAY 220V VIOLET 240V TO FUSB ⑥ VOLTAGE SELECTOR VSB-002
FUSE	125V 800mA (VEK-016)	250V 250mA (VEK-012)		250V 250mA (VEK-014)
SECTION B	AC120V 50Hz	AC240/220V 50/60Hz	AC240/220V WITHOUT POWER PLUG	AC 240/220/120/110V 50/60Hz

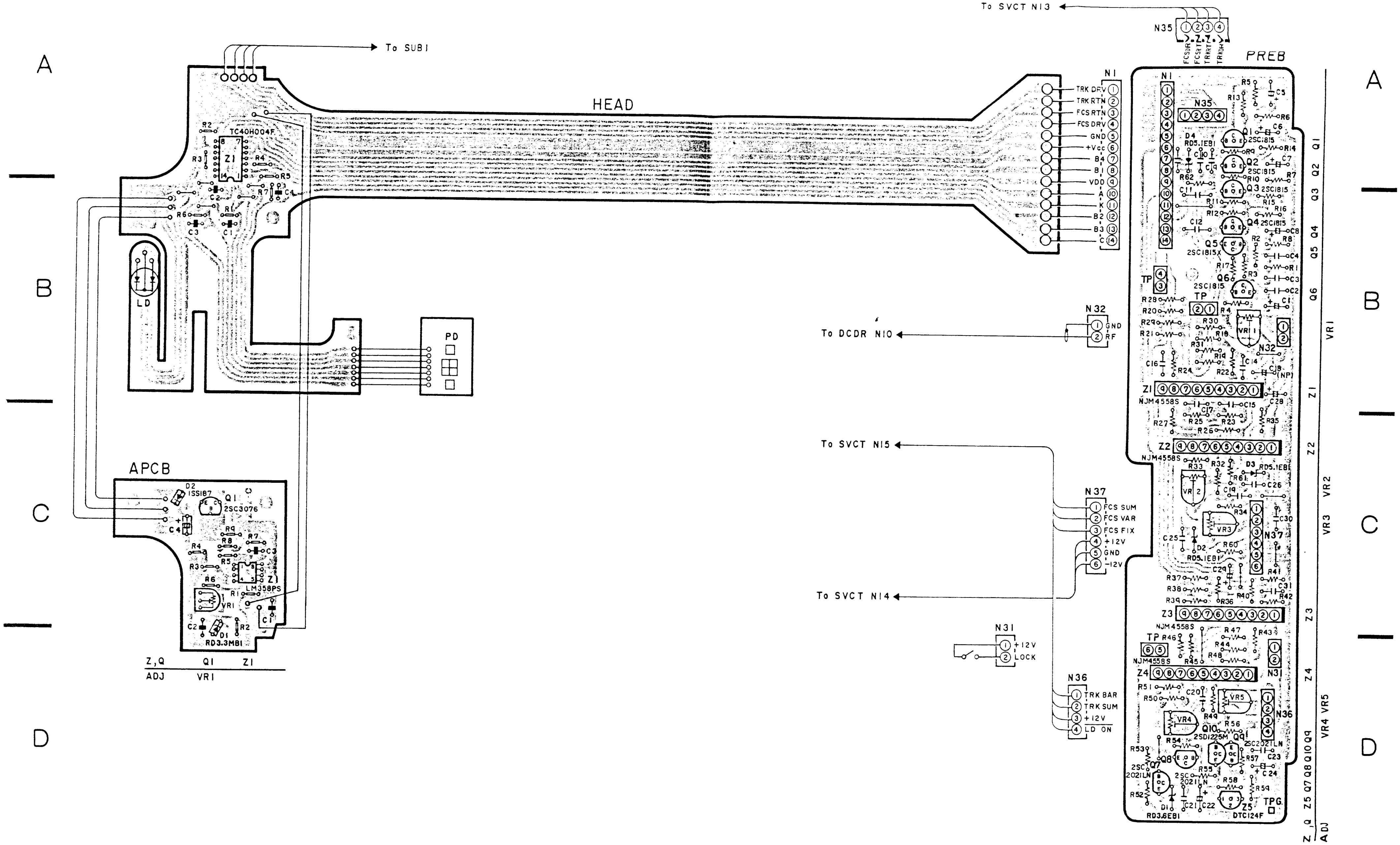
Q1 : 2SD1380
Q2 : 2SD1379
Q3 : 2SB1008
Q4 : 2SC2497
Q5,6 : 2SC1740LN
Q7 : 2SA1096
Q8,9 : 2SA933LN
Q10 : 2SA965

D1~4,18 : SMIA-02
D6~9,19 : SMIA-02
D12~15 : 10DF1
D5 : RD5.6EB2
D10,11 : RD13EB2
D16,17 : HZ6B1L
D20 : RD27EB3
D21 : RD5.1EB3


1
2
3
4
5
A
B
C
D
6
Q Q1 Q2 Q10 Q3 Q6 Q4 Q5 Q8 Q7 Q9
N26
+5V
GND
-26V
FL
FL
To KDCB N47
N39
N33
N42
① ② ③ ④ ⑤ ⑥
+5V +12V GND -12V
+5V +12V GND -12V
+12V -12V GND +15V GND -15V
To AUDF N20
To DCDR N11
To SVCT N17
C30
R20
C29
D21
R19
Q10
2SA965
D20
C28
C26
C24
C20
R15
R16
D17
R18
C25
R17
R12
R10
C27
C23
Q9
2SA933 LN
C5
D19
C13
C19
R11
C18
D18
C4
C14
C17
R9
D16
C22
R14
R1
C10
D10
D11
Q6
2SC1740LN
C16
C3
C9
C8
C12
R8
R2
D5
R3
R4
R6
R7
Q5
Q8
R13
R5
2SC1740LN
2SA933LN
Q1
Q2
Q3
Q4
Q7
2SD1380
2SD1379
2SB1008
2SC2497
2SA1096
D2
D4
D3
D1
C2
C1
D8
D9
C15
D7
C6
D6
D14
C11
D15
D13
C7
D12
C21
11
10
9
8
7
6
5
4
3
2
1
D1~4,6~9,18,19 : SM1A-02 D5 : RD5.6EB2 D10, 11 : RD13EB2
D12~15 : 10DF1 D16,17 : HZ6B1L D20 : RD27EB3 D21 : RD5.1EB3
SYPS
⚠ POWER TRANSFORMER
BLUE
VIOLET
BLUE
RED
BLACK
RED
GRAY
BROWN
GRAY
ORANGE
ORANGE
WHITE
SECTION A
FUSB
⚠FU1
AC IN
⚠
⚠ C1
1 3
2 4
5 6
7 8
⚠
L1
C1 ⚠
⚠ SW1 POWER SWITCH
VNP-279-0
©

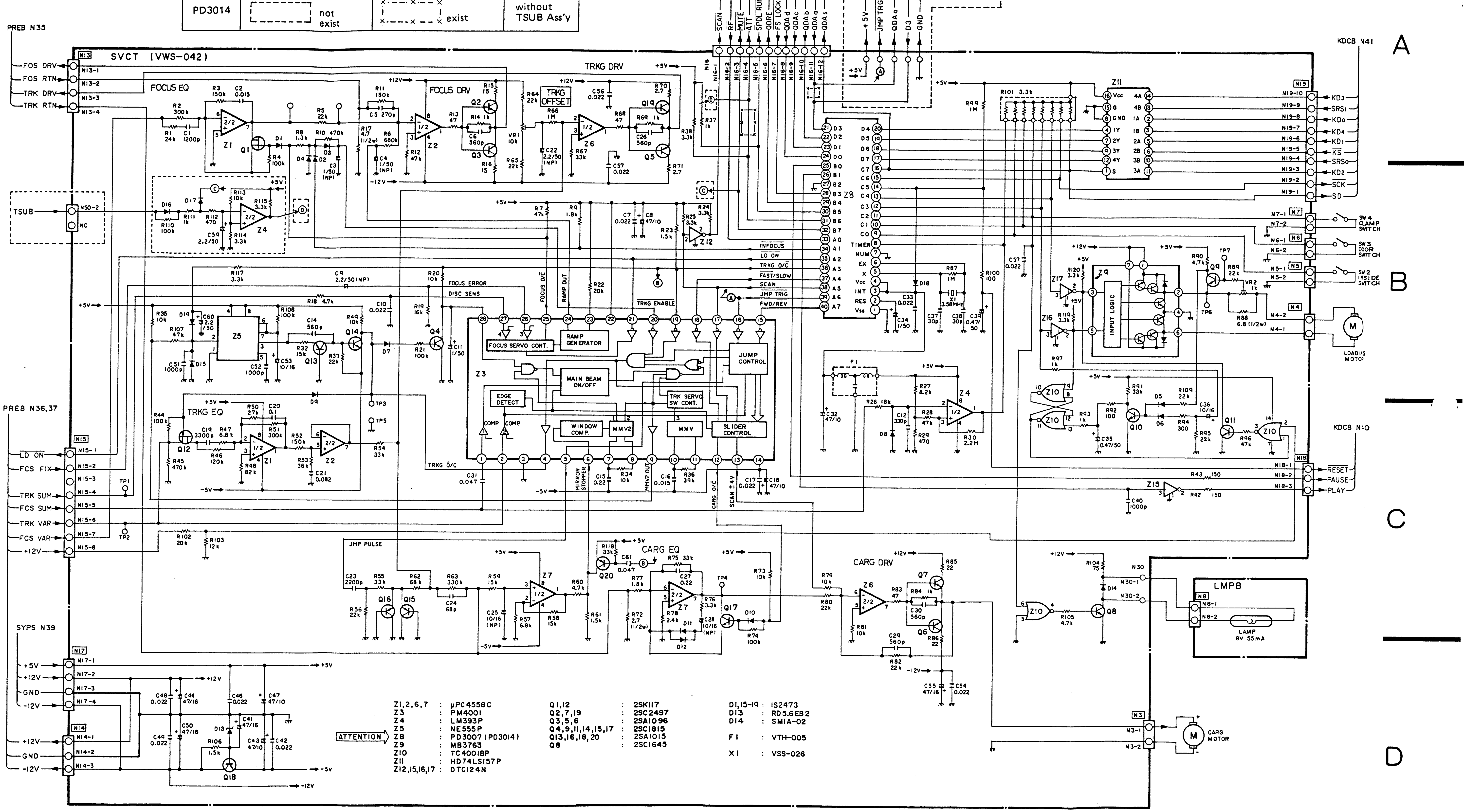
4.4 PICKUP, PREB


PICKUP ASS'Y (VWY-061)
OBJECT LENS
FOCUS COIL
TRKG COIL
COLLIMATE LENS
HALF PRISM
SYLINDRICAL LENS
PHOTO DETECTOR
LASER DIODE
MONITOR
HEAD section
APCB section
Z1 : LM358PS
Q1 : 2SC3076
D1 : RD3.3MB
D2 : 1SS187
C4 : CSZS010M10
Z1 : TC40H004F
PREB (VWV-046)
N1-1
N1-2
N1-3
N1-4
N1-5
N1-6
N1-7
N1-8
N1-9
N1-10
N1-11
N1-12
N1-13
N1-14
Z1~4 : NJM4558S
Z5 : DTC124F
Q1~6 : 2SC1815
Q7~9 : 2SC2021LN
Q10 : 2SD1225M
D1 : RD3.6EB1
D2~4 : RD5.1EB1
FOCUS OFFSET
FOCUS GAIN
RF LEVEL
TRKG BAL
TRKG GAIN
SVCT N13
N35-1 FOCS DRV
N35-2 FOCS RTN
N35-3 TRKG RTN
N35-4 TRKG DRV
DCDR N10
N32-2 RF
N32-1 GND
SVCT N14
N37-6 -12V
N37-5 GND
N37-4 +12V
N37-3 FOCS FIX
N37-2 FOCS VAR
N37-1 FOCS SUM
SVCT N15
N36-1 TRKG VAR
N36-2 TRKG SUM
N36-3 +12V
N36-4 LD ON
N31-1
N31-2
SW1 INTER LOCK SWITCH
TP7
A
B
C
D
1
2
3
4
5
6


1
2
3
4
5
A
B
C
D
6
To SUB1
HEAD
TC40H004F
Z1
R2
R3
R4
R5
R6
R7
R1
C1
C2
C3
C4
LD
PD
APCB
D2
1SS187
Q1
2SC3076
C4
R9
R8
R7
C3
R4
R3
R5
R6
Z1
LM358PS
R1
VR1
C1
C2
D1
R2
RD3.3MB1
Z,Q
ADJ
Q1
VR1
Z1
N1
TRK DRV ①
TRK RTN ②
FCS RTN ③
FCS DRV ④
GND ⑤
+Vcc ⑥
B4 ⑦
B1 ⑧
VDD ⑨
A ⑩
K ⑪
B2 ⑫
B3 ⑬
C ⑭
To SVCT N13
N35
FCSDR
FCSRT
TRKRT
TRKDR
PREB
To DCDR N10
N32
① GND
② RF
To SVCT N15
N37
① FCS SUM
② FCS VAR
③ FCS FIX
④ +12V
⑤ GND
⑥ -12V
To SVCT N14
N31
① +12V
② LOCK
N36
① TRK BAR
② TRK SUM
③ +12V
④ LD ON
D4
RD5.1EB1
Q1 2SC1815
Q2 2SC1815
Q3 2SC1815
Q4 2SC1815
Q5 2SC1815X
Q6 2SC1815
TP
VR1
Z1
NJM4558S
Z2
NJM4558S
D3 RD5.1EB1
VR2
VR3
D2 RD5.1EB1
Z3
NJM4558S
TP
Z4
NJM4558S
VR4
VR5
Q10 2SD1225M
Q9 2SC2021LN
Q8
Q7 2SC2021LN
2SC2021LN
D1 RD3.6EB1
Z5 DTC124F
TPG
C18 (NP)
Q1
Q2
Q3
Q4
Q5
Q6
VR1
Z1
Z2
VR2
VR3
Z3
Z4
VR4 VR5
Q9 Q10
Z5 Q7 Q8
Z, Q
ADJ

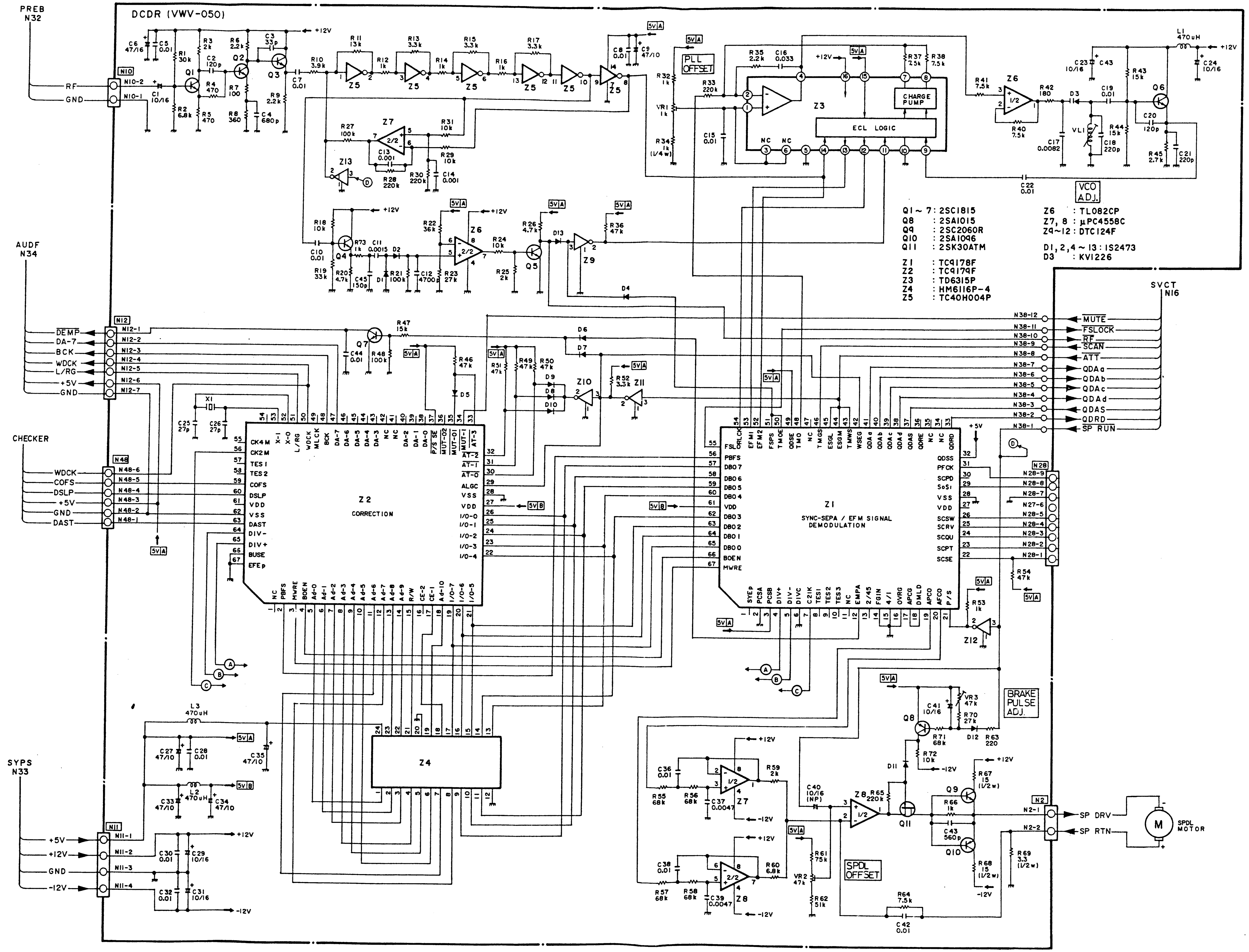
4.5 SVCT, LMPB

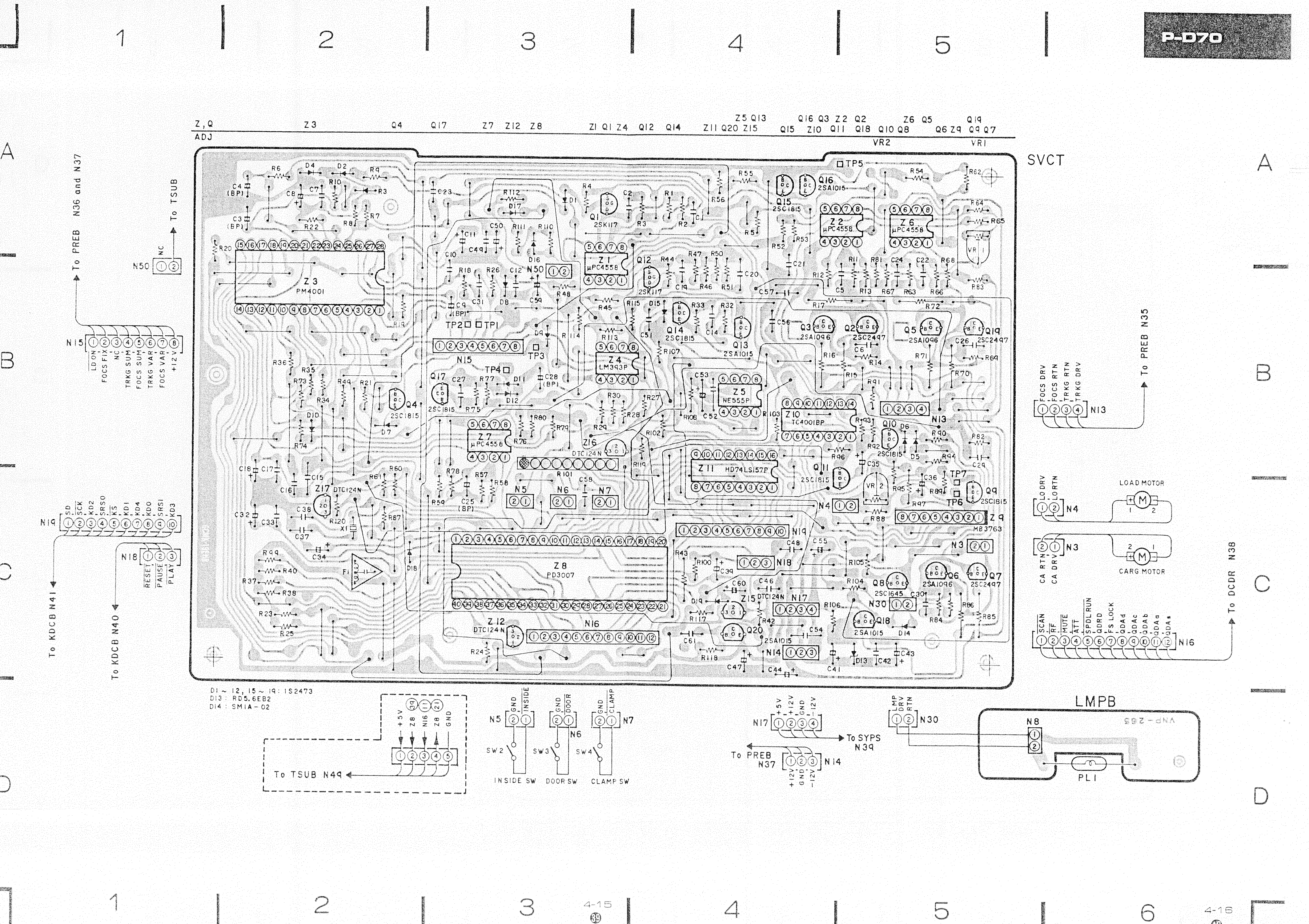
CPU Z8			
PD3007	⬚ exist	⬚ not exist	with TSUB ass'y
PD3014	⬚ not exist	⬚ exist	without TSUB Ass'y

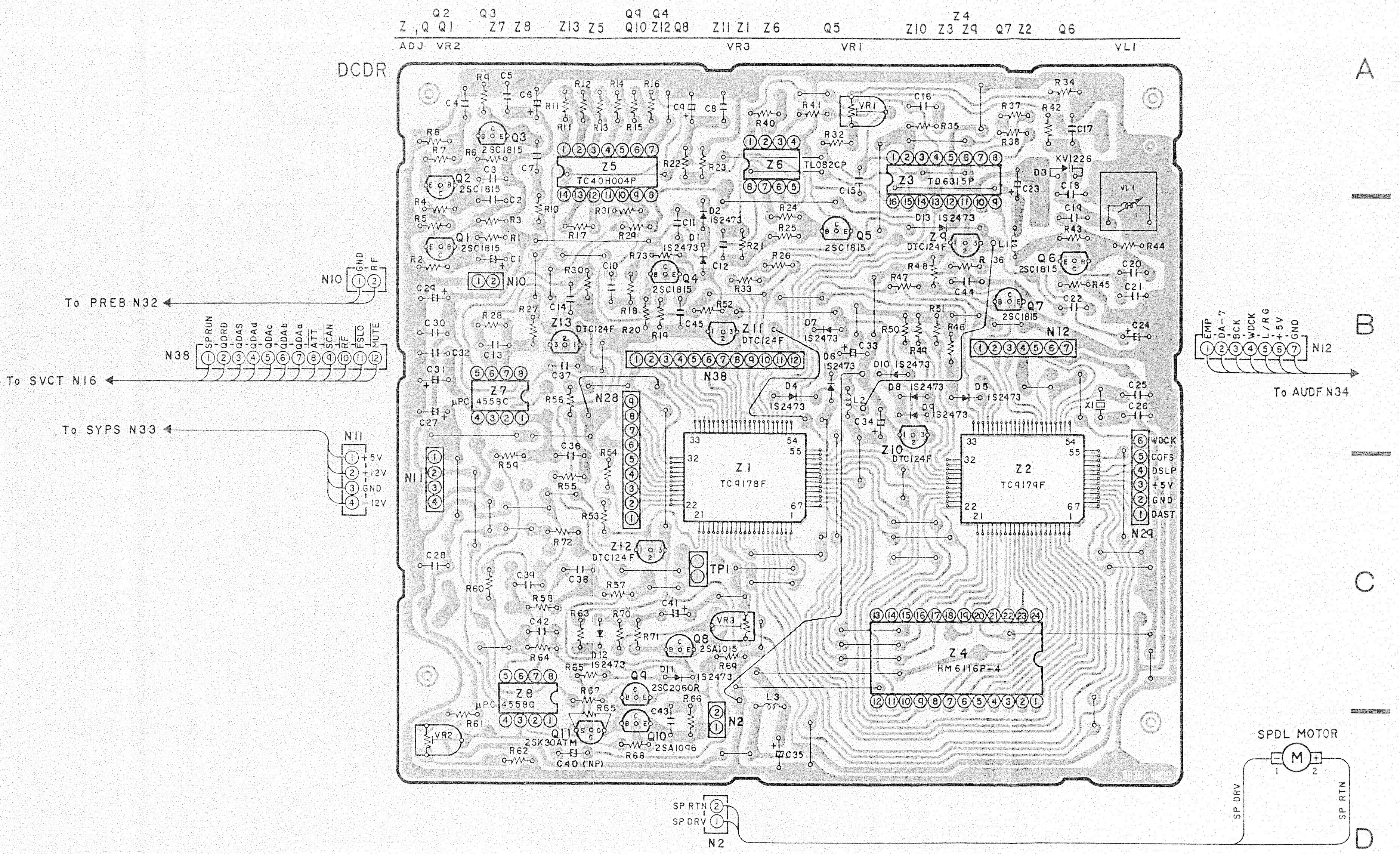

SVCT (VWS-042)
PREB N35
FOS DRV
FOS RTN
TRK DRV
TRK RTN
FOCUS EQ
FOCUS DRV
TRKG DRV
TRKG OFFSET
DCDR N38
SCAN
RF
MUTE
ATT
SPDL RUN
QDRE
FS LOCK
QDAd
QDAc
QDAb
QDAa
TSUB
+5V
JMP TRG
D3
GND
KDCB N41
KD3
SRS1
KD0
KD4
KD1
KS
SRS0
KD2
SCK
SD
SW4 CLAMP SWITCH
SW3 DOOR SWITCH
SW2 INSIDE SWITCH
LOADING MOTOR
TRKG EQ
FOCUS ERROR
DISC SENS
TRKG ENABLE
INFOCUS
LD ON
TRKG O/C
FAST/SLOW
JMP TRIG
FWD/REV
FOCUS SERVO CONT.
RAMP GENERATOR
MAIN BEAM ON/OFF
EDGE DETECT
TRK SERVO SW CONT.
JUMP CONTROL
WINDOW COMP.
MMV2
MMV
SLIDER CONTROL
MIRROR STOPPER
CARG O/C
SCAN +4V
INPUT LOGIC
PREB N36,37
LD ON
FCS FIX
TRK SUM
FCS SUM
TRK VAR
FCS VAR
+12V
KDCB N40
RESET
PAUSE
PLAY
JMP PULSE
CARG EQ
CARG DRV
LMPB
LAMP 8V 55mA
CARG MOTOR
SYPS N39
+5V
+12V
GND
-12V

Z1,2,6,7 : μPC4558C	Q1,12 : 2SK117	D1,15~19 : IS2473
Z3 : PM4001	Q2,7,19 : 2SC2497	D13 : RD5.6EB2
Z4 : LM393P	Q3,5,6 : 2SA1096	D14 : SMIA-02
Z5 : NE555P	Q4,9,11,14,15,17 : 2SC1815	
ATTENTION ⇨ Z8 : PD3007 (PD3014)	Q13,16,18,20 : 2SA1015	F1 : VTH-005
Z9 : MB3763	Q8 : 2SC1645	
Z10 : TC4001BP		X1 : VSS-026
Z11 : HD74LS157P		
Z12,15,16,17 : DTC124N		

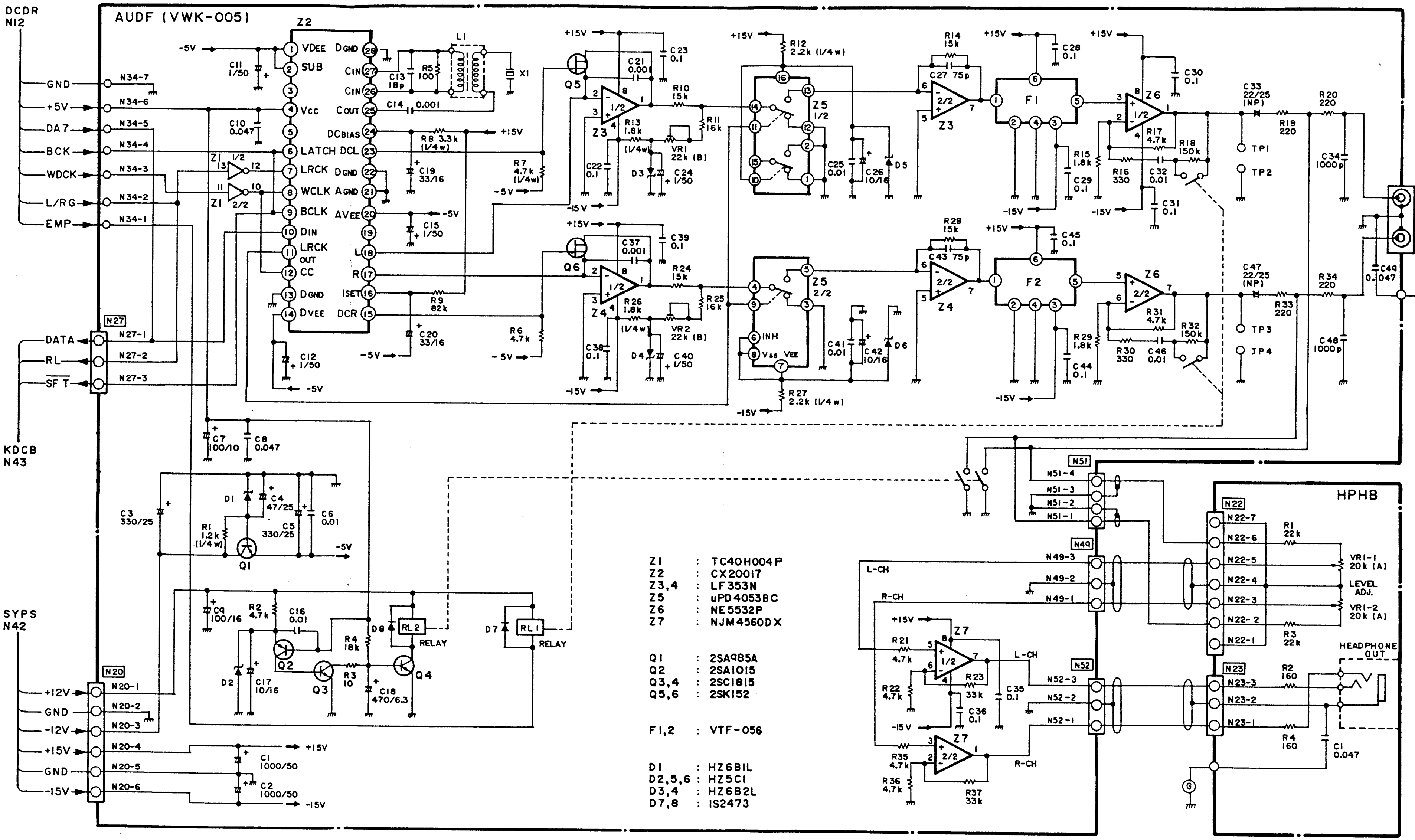
4.6 DCDR


DCDR (VWV-050)
PREB N32
RF
GND
N10-2
N10-1
AUDF N34
DEMP
DA-7
BCK
WDCK
L/RG
+5V
GND
N12-1
N12-2
N12-3
N12-4
N12-5
N12-6
N12-7
CHECKER
WDCK
COFS
DSLP
+5V
GND
DAST
N48-6
N48-5
N48-4
N48-3
N48-2
N48-1
SYPS N33
+5V
+12V
GND
-12V
N11-1
N11-2
N11-3
N11-4
SVCT N16
MUTE
FSLOCK
RF
SCAN
ATT
QDAa
QDAb
QDAc
QDAd
QDAS
QDRD
SP RUN
N38-12
N38-11
N38-10
N38-9
N38-8
N38-7
N38-6
N38-5
N38-4
N38-3
N38-2
N38-1
N28
N28-9
N28-8
N28-7
N27-6
N28-5
N28-4
N28-3
N28-2
N28-1
N2
N2-1
N2-2
SP DRV
SP RTN
SPDL MOTOR
M
Z2
CORRECTION
Z1
SYNC-SEPA / EFM SIGNAL DEMODULATION
Z3
ECL LOGIC
CHARGE PUMP
Z4
PLL OFFSET
VCO ADJ.
BRAKE PULSE ADJ.
SPDL OFFSET
5V A
5V B
+12V
-12V
L1 470uH
L2 470uH
L3 470uH
X1
VR1 1k
VR2 47k
VR3 47k
VL1
Q1~7 : 2SC1815
Q8 : 2SA1015
Q9 : 2SC2060R
Q10 : 2SA1096
Q11 : 2SK30ATM
Z1 : TC9178F
Z2 : TC9179F
Z3 : TD6315P
Z4 : HM6116P-4
Z5 : TC40H004P
Z6 : TL082CP
Z7, 8 : μPC4558C
Z9~12 : DTC124F
D1,2,4~13 : 1S2473
D3 : KV1226


1
2
3
4
5
A
B
C
D
Z, Q
ADJ
Z3
Q4
Q17
Z7 Z12 Z8
Z1 Q1 Z4 Q12 Q14
Z11 Q20 Z15
Z5 Q13
Q16 Q3 Z2 Q2
Q15 Z10 Q11 Q18 Q10 Q8
Z6 Q5
Q6 Z9 Q9 Q7
Q19
VR2
VR1
SVCT
To PREB N36 and N37
To TSUB
NC
N50
N15
LD ON
FOCS FIX
NC
TRKG SUM
FOCS SUM
TRKG VAR
FOCS VAR
+12V
N19
SD
SCK
KD2
SRSO
KS
KD1
KD4
KD0
SRSI
KD3
N18
RESET
PAUSE
PLAY
To KDCB N41
To KDCB N40
Z3 PM4001
Z1 μPC4558
Z2 μPC4558
Z6 μPC4558
Z4 LM393P
Z5 NE555P
Z7 μPC4556
Z10 TC4001BP
Z11 HD74LS157P
Z8 PD3007
Z9 MB3763
Z12 DTC124N
Z15 DTC124N
Z16 DTC124N
Z17 DTC124N
Q1 2SK117
Q12 2SK117
Q4 2SC1815
Q17 2SC1815
Q14 2SC1815
Q15 2SC1815
Q16 2SA1015
Q13 2SA1015
Q3 2SA1096
Q2 2SC2497
Q5 2SA1096
Q19 2SC2497
Q10 2SC1815
Q11 2SC1815
Q9 2SC1815
Q8 2SC1645
Q6 2SA1096
Q7 2SC2497
Q18 2SA1015
Q20 2SA1015
TP1
TP2
TP3
TP4
TP5
TP6
TP7
N13
N4
N3
N5
N6
N7
N14
N16
N17
N30
FOCS DRV
FOCS RTN
TRKG RTN
TRKG DRV
To PREB N35
LO DRV
LO RTN
LOAD MOTOR
CA RTN
CA DRV
CARG MOTOR
SCAN
RF
MUTE
ATT
SPDL RUN
QDRD
FS LOCK
QDAd
QDAc
QDAb
QDAa
QDAs
To DCDR N38
D1 ~ 12, 15 ~ 19 : 1S2473
D13 : RD5.6EB2
D14 : SM1A-02
+5V
Z8
N16
Z8
GND
To TSUB N49
GND
INSIDE
DOOR
CLAMP
SW2
SW3
SW4
INSIDE SW
DOOR SW
CLAMP SW
+5V
+12V
GND
-12V
To SYPS N39
To PREB N37
LMP
DRV
RTN
LMPB
N8
VNP-265
PL1
6


DCDR
Z ,Q Q1
Q2
Q3
Z7 Z8
Z13 Z5
Q9 Q4
Q10 Z12 Q8
Z11 Z1 Z6
Q5
Z4
Z10 Z3 Z9
Q7 Z2
Q6
ADJ VR2
VR3
VR1
VL1
Q3 2SC1815
Q2 2SC1815
Q1 2SC1815
Q4 2SC1815
Q5 2SC1815
Q6 2SC1815
Q7 2SC1815
Z5 TC40H004P
Z6 TL082CP
Z3 TD6315P
KV1226
Z9 DTC124F
Z11 DTC124F
Z13 DTC124F
Z10 DTC124F
Z12 DTC124F
Z7 μPC 4558C
Z8 μPC 4558C
Z1 TC9178F
Z2 TC9179F
Z4 HM6116P-4
Q8 2SA1015
Q9 2SC2060R
Q10 2SA1096
Q11 2SK30ATM
D1 D2 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 1S2473
C40 (NP)
TP1
X1
L1 L2 L3
N10 GND RF
To PREB N32
N38 SPRUN QDRD QDAS QDAd QDAc QDAb QDAa ATT SCAN RF SLO MUTE
To SVCT N16
To SYPS N33
N11 +5V +12V GND -12V
N28
N29 WOCK COFS DSLP +5V GND DAST
N12 EMP DA-7 BCK WDCK L/RG +5V GND
To AUDF N34
N2 SP RTN SP DRV
SPDL MOTOR M
SP DRV
SP RTN
1 2 3 4 5 6
A B C D

4.7 AUDF, HPHB

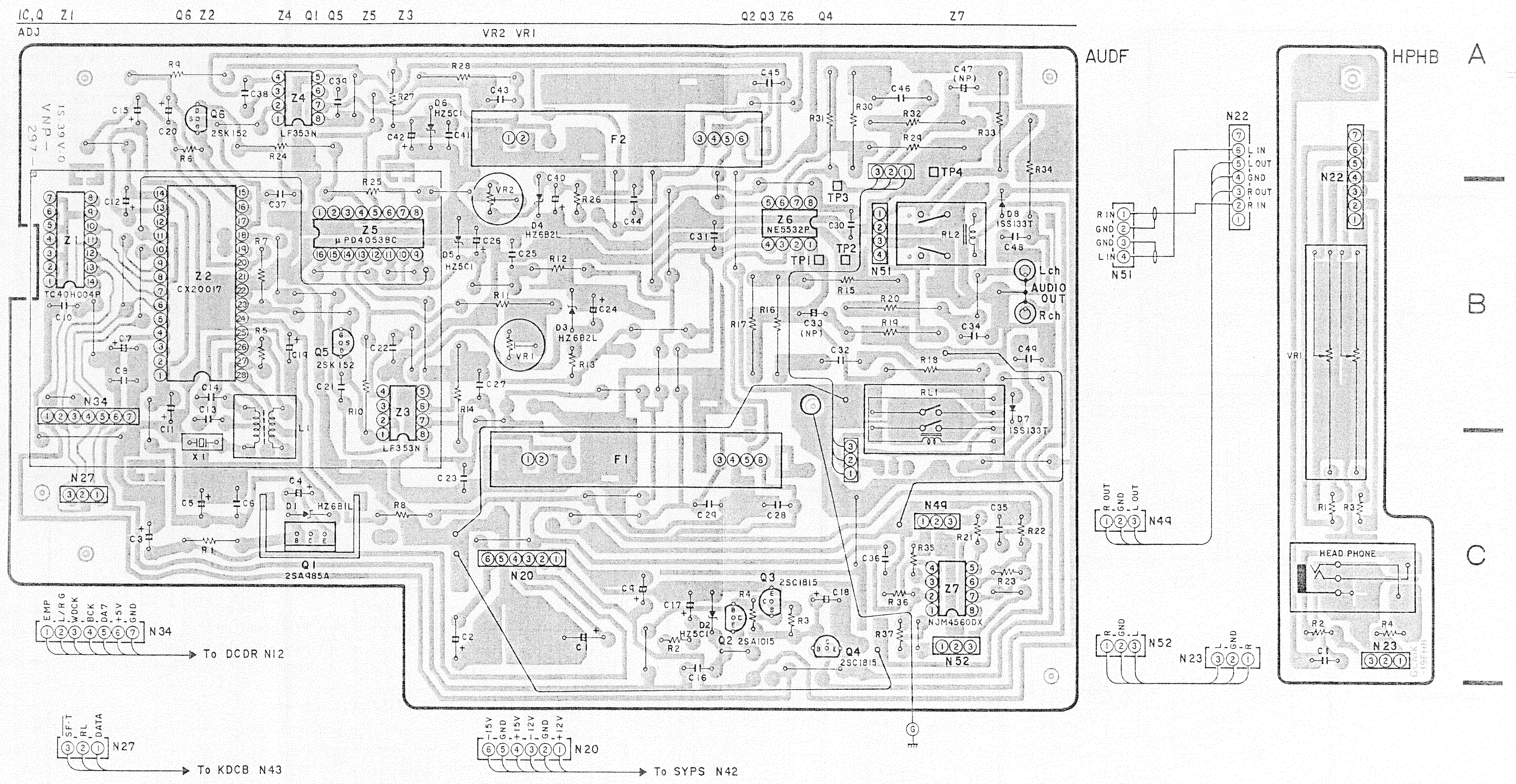

AUDF (VWK-005)
DCDR N12
GND
+5V
DA7
BCK
WDCK
L/RG
EMP
N34-7
N34-6
N34-5
N34-4
N34-3
N34-2
N34-1
N27
DATA
RL
SFT
N27-1
N27-2
N27-3
KDCB N43
SYPS N42
N20
+12V
GND
-12V
+15V
GND
-15V
N20-1
N20-2
N20-3
N20-4
N20-5
N20-6
Z2
VDEE
SUB
Vcc
LATCH
LRCK
WCLK
BCLK
DIN
LRCK OUT
CC
DGND
DVEE
DGND
CIN
CIN
COUT
DCBIAS
DCL
DGND
AGND
AVEE
L
R
ISET
DCR
L1
X1
Z1
Z3
Z4
Z5
Z6
Z7
Q1
Q2
Q3
Q4
Q5
Q6
F1
F2
INH
Vss
VEE
TP1
TP2
TP3
TP4
RL1
RL2
RELAY
L CH
R CH
AUDIO OUT
HPHB
N22
N23
N49
N51
N52
L-CH
R-CH
VR1-1 20k (A)
LEVEL ADJ.
VR1-2 20k (A)
HEADPHONE OUT
+15V
-15V
-5V

Z1 : TC40H004P
Z2 : CX20017
Z3,4 : LF353N
Z5 : uPD4053BC
Z6 : NE5532P
Z7 : NJM4560DX

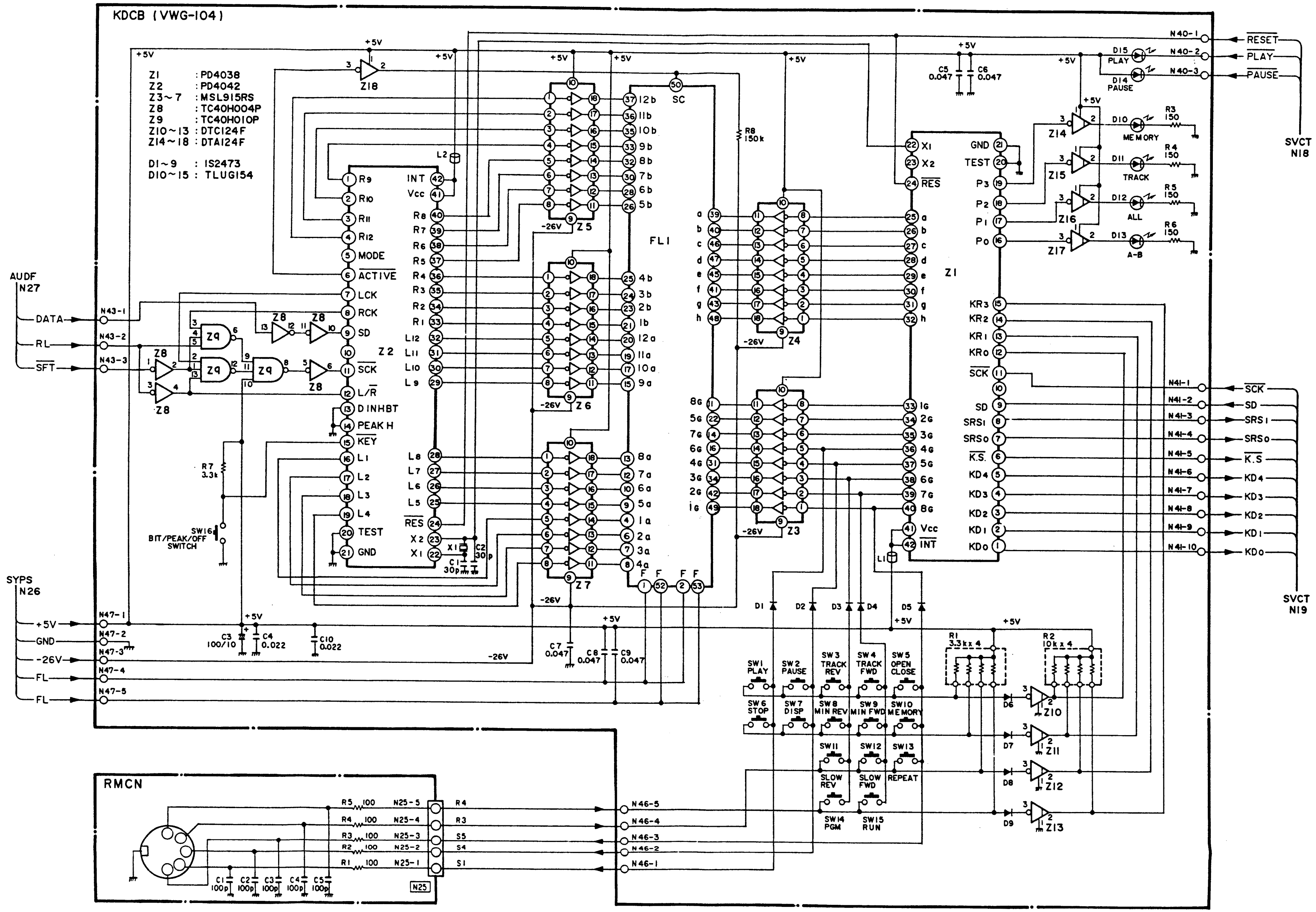
Q1 : 2SA985A
Q2 : 2SA1015
Q3,4 : 2SC1815
Q5,6 : 2SK152

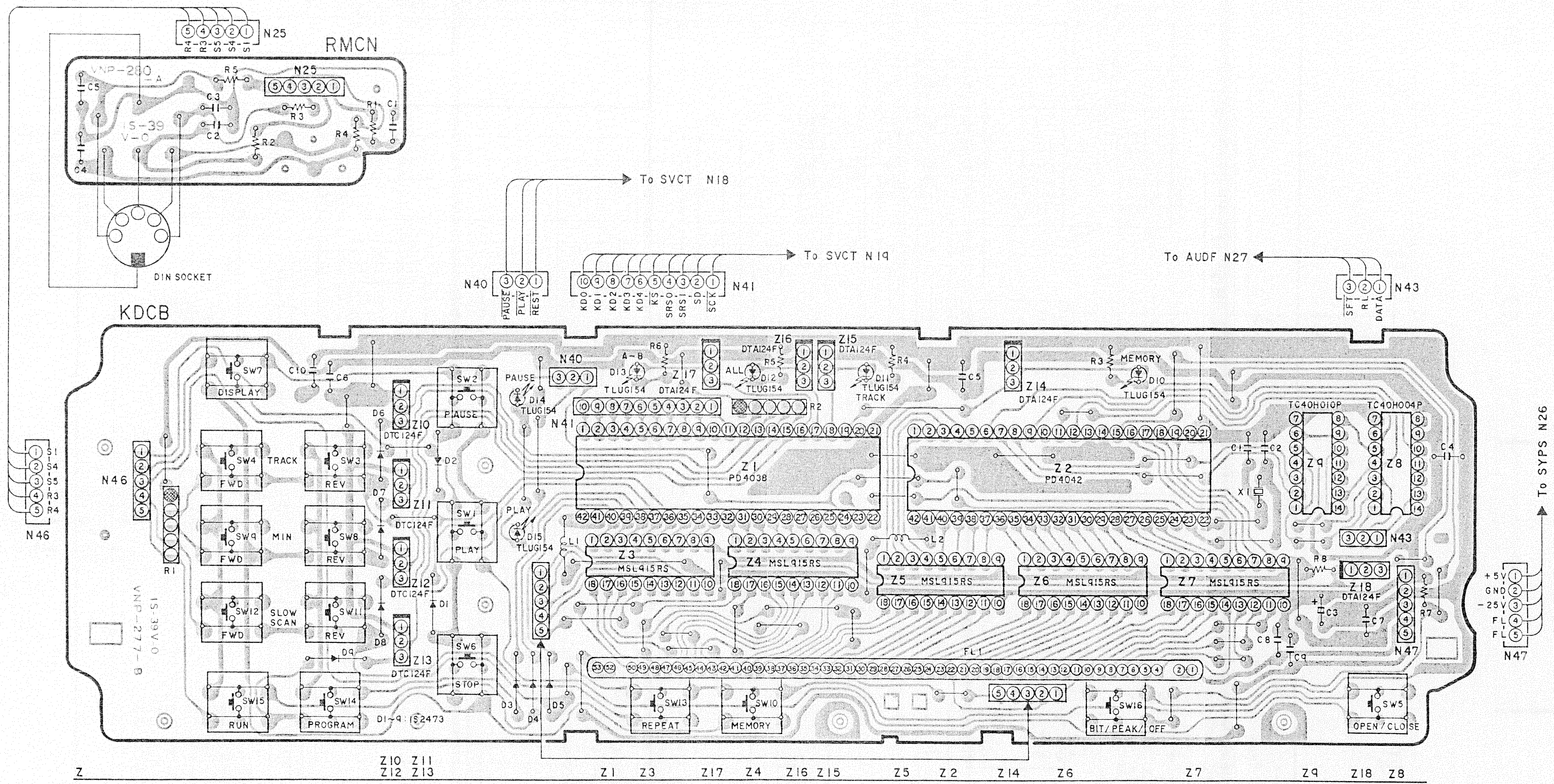
F1,2 : VTF-056

D1 : HZ6B1L
D2,5,6 : HZ5C1
D3,4 : HZ6B2L
D7,8 : IS2473

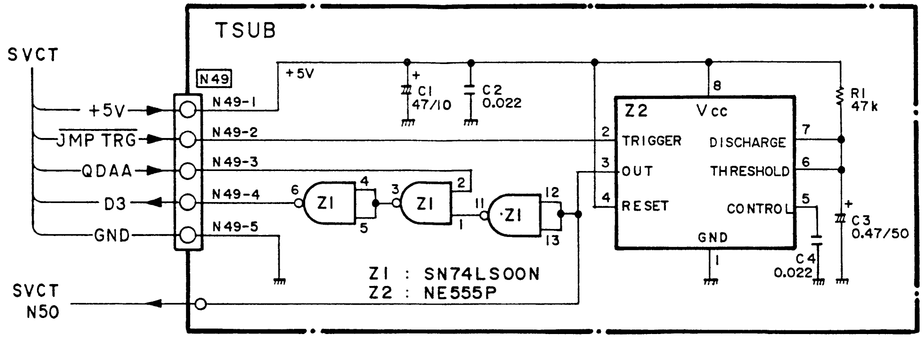

IC,Q Z1 Q6 Z2 Z4 Q1 Q5 Z5 Z3 Q2 Q3 Z6 Q4 Z7
ADJ VR2 VR1
AUDF
HPHB
Z1 TC40H004P
Z2 CX20017
Z3 LF353N
Z4 LF353N
Z5 μPD4053BC
Z6 NE5532P
Z7 NJM4560DX
Q1 2SA985A
Q2 2SA1015
Q3 2SC1815
Q4 2SC1815
Q5 2SK152
Q6 2SK152
D1 HZ6B1L
D2 HZ5C1
D3 HZ6B2L
D4 HZ6B2L
D5 HZ5C1
D6 HZ5C1
D7 1SS133T
D8 1SS133T
F1
F2
RL1
RL2
VR1
VR2
L1
X1
C33 (NP)
C47 (NP)
TP1 TP2 TP3 TP4
Lch
AUDIO OUT
Rch
N51: R IN, GND, GND, L IN
N22: L IN, L OUT, GND, R OUT, R IN
N49: R OUT, GND, L OUT
N52: R, GND, L
N23: L, GND, R
HEAD PHONE
N34: EMP, L/RG, WDCK, BCK, DATA, +5V, GND
To DCDR N12
N27: SFT, RL, DATA
To KDCB N43
N20: -15V, GND, +15V, -12V, GND, +12V
To SYPS N42
15-39V-0 VNP-297-B

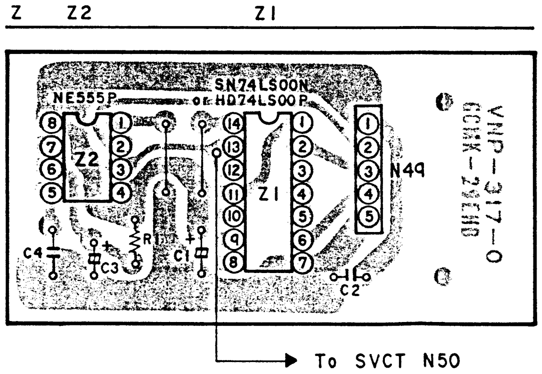
4.8 KDCB, RMCN

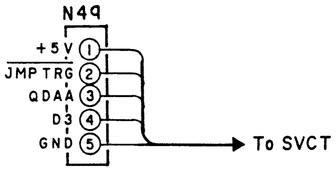

KDCB (VWG-104)
Z1 : PD4038
Z2 : PD4042
Z3~7 : MSL915RS
Z8 : TC40H004P
Z9 : TC40H010P
Z10~13 : DTC124F
Z14~18 : DTA124F
D1~9 : 1S2473
D10~15 : TLUG154
+5V
-26V
Z18
Z2
Z1
FL1
Z3
Z4
Z5
Z6
Z7
Z8
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
Z17
R9
R10
R11
R12
MODE
ACTIVE
LCK
RCK
SD
SCK
L/R
DINHBT
PEAK H
KEY
L1
L2
L3
L4
TEST
GND
INT
Vcc
R8
R7
R6
R5
R4
R3
R2
R1
L12
L11
L10
L9
L8
L7
L6
L5
RES
X2
X1
X1
C1 30p
C2 30p
L2
L1
SC
12b
11b
10b
9b
8b
7b
6b
5b
4b
3b
2b
1b
12a
11a
10a
9a
8a
7a
6a
5a
1a
2a
3a
4a
F
R8 150k
a
b
c
d
e
f
g
h
8G
5G
7G
6G
4G
3G
2G
1G
X1
X2
RES
GND
TEST
P3
P2
P1
P0
KR3
KR2
KR1
KR0
SCK
SD
SRS1
SRS0
K.S.
KD4
KD3
KD2
KD1
KD0
Vcc
INT
C5 0.047
C6 0.047
D15 PLAY
D14 PAUSE
D10 MEMORY
D11 TRACK
D12 ALL
D13 A-B
R3 150
R4 150
R5 150
R6 150
N40-1
N40-2
N40-3
RESET
PLAY
PAUSE
SVCT N18
N41-1
N41-2
N41-3
N41-4
N41-5
N41-6
N41-7
N41-8
N41-9
N41-10
SCK
SD
SRS1
SRS0
K.S
KD4
KD3
KD2
KD1
KD0
SVCT N19
AUDF N27
DATA
RL
SFT
N43-1
N43-2
N43-3
R7 3.3k
SW16 BIT/PEAK/OFF SWITCH
SYPS N26
+5V
GND
-26V
FL
FL
N47-1
N47-2
N47-3
N47-4
N47-5
C3 100/10
C4 0.022
C10 0.022
C7 0.047
C8 0.047
C9 0.047
D1
D2
D3
D4
D5
D6
D7
D8
D9
SW1 PLAY
SW2 PAUSE
SW3 TRACK REV
SW4 TRACK FWD
SW5 OPEN CLOSE
SW6 STOP
SW7 DISP
SW8 MIN REV
SW9 MIN FWD
SW10 MEMORY
SW11 SLOW REV
SW12 SLOW FWD
SW13 REPEAT
SW14 PGM
SW15 RUN
R1 3.3k x 4
R2 10k x 4
RMCN
R5 100
R4 100
R3 100
R2 100
R1 100
N25-5
N25-4
N25-3
N25-2
N25-1
R4
R3
S5
S4
S1
N46-5
N46-4
N46-3
N46-2
N46-1
C1 100p
C2 100p
C3 100p
C4 100p
C5 100p
N25
1
2
3
4
5
6
A
B
C
D


RMCN
N25
R4 R3 S5 S4 S1
VNP-280
1S-39
V-0
R5 C5 C3 C2 C4 R3 R2 R1 C1 R4
DIN SOCKET
To SVCT N18
To SVCT N19
To AUDF N27
N40
PAUSE PLAY REST
N41
KD0 KD1 KD2 KD3 KD4 KS SRS0 SRS1 SD SCK
N43
SFT RL DATA
KDCB
SW7 DISPLAY
C10 C6
SW2 PAUSE
D14 TLUG154
D13 A-B TLUG154
R6
Z17 DTA124F
Z16 DTA124F
ALL D12 TLUG154
R5
Z15 DTA124F
D11 TLUG154 TRACK
R4
C5
Z14 DTA124F
R3 MEMORY D10 TLUG154
TC40H010P
TC40H004P
S1 S4 S5 R3 R4
N46
SW4 TRACK FWD
SW3 REV
D6 Z10 DTC124F
D2
SW9 MIN FWD
SW8 REV
D7 Z11 DTC124F
SW1 PLAY
D15 TLUG154
SW12 SLOW SCAN FWD
SW11 REV
Z12 DTC124F
D1
D8 D9 Z13 DTC124F
SW6 STOP
R1
1S-39V-0
VNP-277-B
Z1 PD4038
Z2 PD4042
C1 C2 X1
Z9 Z8
C4
Z3 MSL915RS
Z4 MSL915RS
L1 L2
Z5 MSL915RS
Z6 MSL915RS
Z7 MSL915RS
R8
Z18 DTA124F
C3 C7 R7
C8 C9
FL1
N47
+5V GND -25V FL FL
To SYPS N26
SW15 RUN
SW14 PROGRAM
D1~9:1S2473
D3 D4 D5
SW13 REPEAT
SW10 MEMORY
SW16 BIT/PEAK/OFF
SW5 OPEN/CLOSE
Z
Z10 Z11
Z12 Z13
Z1 Z3 Z17 Z4 Z16 Z15 Z5 Z2 Z14 Z6 Z7 Z9 Z18 Z8

4.9 TSUB


TSUB
SVCT
+5V
JMP TRG
QDAA
D3
GND
N49
N49-1
N49-2
N49-3
N49-4
N49-5
+5V
C1 47/10
C2 0.022
R1 47k
Z2
Vcc
TRIGGER
DISCHARGE
OUT
THRESHOLD
RESET
CONTROL
GND
C3 0.47/50
C4 0.022
Z1
Z1 : SN74LS00N
Z2 : NE555P
SVCT N50


Z Z2 Z1
NE555P
SN74LS00N or HD74LS00P
Z2
Z1
N49
C4
C3
R1
C1
C2
VNP-317-0
GCNK-2160
To SVCT N50


N49
+5V
JMP TRG
QDAA
D3
GND
To SVCT

4.10 PARTS LIST

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

SYPS(VWR-041) Parts list 1

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
	2SD1380	Q	1
	2SD1379	Q	2
	2SB1008	Q	3
	2SC2497	Q	4
	2SC1740LN	Q	5, 6
	2SA1096	Q	7
	2SA933LN	Q	8, 9
	2SA965	Q	10
	SM1A-02	D	1- 4, 6- 9, 18, 19
	RD5.6EB2	D	5
	RD13EB2	D	10, 11
	10DF1	D	12- 15
	HZ6B1L	D	16, 17
	RD27EB3	D	20
	RD5.1EB3	D	21
	RD1/6PS□□□J	R	1- 20
	CKDYF103Z50	C	1, 5, 6, 10, 14
	VCH-021	C	2 3300/16
	CEA4R7M50	C	3, 19, 25
	CEA470M10	C	4
	VCH-013	C	7, 11 1000/35
	CEA470M35	C	8, 12, 16, 22
	CEA470M25	C	9, 13
	VCH-019	C	15, 21
	VCF-001	C	17, 23
	CEYA221M25	C	18, 24
	CEYA222M25	C	20, 26
	CEA221M50	C	27
	CEA101M50	C	28- 30
	VBF-003		Ceramic tube
	VBA-003		Screw
	VEC-072		Spacer

FUSB(VWR-047) Parts list 1

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
⚠	VCG-018	C	1 Capacitor
⚠	VTL-003	L	1 Line filter
⚠	VEK-012	FU	1 Fuse
	VKR-002		Fuse holder

PREB(VWV-046) Parts list 1

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
	NJM4558S	Z	1- 4
	DTC124F	Z	5
	2SC1815	Q	1- 6
	2SC2021LN	Q	7- 9
	2SD1225M	Q	10
	RD3.6EB1	D	1
	RD5.1EB1	D	2- 4
	RD1/6PS□□□J	R	1- 55, 57- 62
	RD1/4PM□□□J	R	56
	VCP-070	VR	1 1k
	VCP-080	VR	2 47k
	VCP-074	VR	3, 5 4.7k
	VCP-085	VR	4 330k
	CEA330M16	C	1, 22, 24, 28, 29
	CKDYF103Z50	C	2, 19, 21, 23, 25- 27, 30, 31
	VCG-003	C	3, 4, 9- 12, 20 0.047
	CEA220M16	C	5- 8
	CCDSL101J50	C	14- 17
	CEA010M50NP	C	18

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

SVCT(VWS-042) Parts list 1

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
	uPC4558C	Z	1, 2, 6, 7
	(NJM4558D)		
	PM4001	Z	3
	LM393P	Z	4
	(uPC393C)		
	NE555P	Z	5
	PD3007	Z	8
	MB3763	Z	9
	TC4001BP	Z	10
	(MB84001BM)		
	SN74LS157N	Z	11
	(HD74LS157P)		
	DTC124N	Z	12, 15- 17
	2SK117	Q	1, 12
	2SC2497	Q	2, 7, 19
	2SA1096	Q	3, 5, 6
	2SC1815	Q	4, 9- 11, 14, 15, 17
	2SC1645	Q	8
	2SA1015	Q	13, 16, 18, 20
	1S2473	D	1- 12, 15- 19
	RD5.6EB2	D	13
	SM1A-02	D	14
	RD1/6PS□□□J	R	1- 14, 18, 19, 21- 29, 32- 42, 44- 69, 73- 84, 87, 89- 100,102-107,109
	RD1/4PM□□□J	R	15, 16, 43, 70, 71, 85, 86
	RD1/2PS□□□J	R	17, 72, 85, 86
	RD1/4VM□□□J	R	20, 23, 30, 34,108,116-120
	RD1/2VS6R8J	R	88
	VCN-070	R	101 8P 3.3k
	VCP-076	VR	1 10k
	VCP-070	VR	2 1k
	CQMA122J50	C	1
	CQMA393J50	C	2
	CEA010M50NP	C	3, 4
	CCDSL271J50	C	5
	CCDSL561J50	C	6, 14, 26, 29, 30
	CKDYF223Z50	C	7, 10, 17, 33, 42, 46, 48, 49, 54, 56- 58
	CEA470M10	C	8, 18, 32, 43, 47
	CEA2R2M50NP	C	9, 22
	CEA010M50	C	11, 34
	CCDSL331J50	C	12
	CQMA224J50	C	15, 27
	CQMA153J50	C	16
	CQMA332J50	C	19
	CQMA104J50	C	20
	CQMA823J50	C	21
	CQMA222J50	C	23
	CCDSL680J50	C	24
	CEA100M16NP	C	25, 28
	CQMA473J50	C	31, 61
	CEAR47M50	C	35, 39
	CEA100M16	C	36, 53
	CCDSL300J50	C	37, 38
	CEA470M16	C	41, 44, 50, 55
	CQMA102J50	C	51, 52
	CEA2R2M50	C	59, 60

SVCT(VWS-042) Parts list 2

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
	VTH-005	F	1
	VSS-026	X	1 3.58MHz
	VKH-012		IC 40P socket

LMPB(VWY-044) Parts list 1

(MK)	(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
	VEL-003		Lamp

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

AUDF(VWK-005) Parts list 1

(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
TC40H004P	Z	1
CX20017	Z	2 D/A
LF353N	Z	3, 4
uPD4053BC	Z	5
NE5532P	Z	6
NJM4560DX	Z	7
2SA985A	Q	1
2SA1015	Q	2
2SC1815	Q	3, 4
2SK152-3	Q	5, 6
HZ6B1L	D	1
HZ5C1	D	2, 5, 6
HZ6B2L	D	3, 4
1S2473	D	7, 8
RD1/4PM□□□J	R	1, 7, 8, 12, 27
RD1/6PS□□□J	R	2- 6, 21- 23, 35- 37
VCN-117	R	9 82.0k
VCN-118	R	10, 14, 24, 28 15.0k
VCN-123	R	11, 25 16.0k
RD1/4VM□□□J	R	13, 26
VCN-121	R	15, 29 1.80k
VCN-120	R	16, 30 330
VCN-079	R	17, 31 4.70k
VCN-122	R	18, 32 150k
VCN-115	R	19, 20, 33, 34 220
VCR-028	VR	1, 2 22k
CEYA102M50	C	1, 2
CEYA331M25	C	3, 5
CEYA470M25	C	4
VCE-020	C	6, 25, 41
CEA101M10	C	7
VCG-025	C	8, 10, 49
CEA101M16	C	9
CEA010M50	C	11, 12, 15, 24, 40
CCDCH180J50	C	13
CKDYB102K50	C	14
CKDYF103Z50	C	16
CEA100M16	C	17, 26, 42
CEA471M6R3	C	18
CEA330M16	C	19
CEYA330M25	C	20
VCE-017	C	21, 37 1000p
VCE-019	C	22, 23, 28- 31, 35, 36, 38, 39, 44, 45
VCF-004	C	27, 43 75p
VCE-018	C	32, 46 0.01
CEXANP220M25	C	33, 47
CKDYF223Z50	C	50
VTL-156	L	1
VTF-056	F	1, 2 L.P.F
VSS-030	X	1 35.002MHz
VSR-006	RL	1 Reed relay
VSR-005	RL	2 12V

DCDR(VWV-050) Parts list 1

(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
TC9178F	Z	1
TC9179F	Z	2
TD6315P	Z	3
HM6116P-4	Z	4
TC40H004P	Z	5
TL082CP	Z	6
uPC4558C (NJM4558D)	Z	7, 8
DTC124F	Z	9- 13
2SC1815	Q	1- 7
2SA1015	Q	8
2SC2060	Q	9
2SA1096	Q	10
2SK30ATM	Q	11
1S2473	D	1, 2, 4- 13
KV1226YBR	D	3
RD1/6PS□□□J	R	1- 8, 10- 33, 35- 38, 40- 66, 70- 72
RD1/4VM□□□J	R	9, 34, 73
RD1/2VS□□□J	R	67- 69
VCP-070	VR	1 1K
VCP-080	VR	2, 3 47k
CEA100M16	C	1, 23, 24, 29, 31
CCDCH121J50	C	2
CCDCH330J50	C	3
CCDSL681J50	C	4
CKDYF103Z50	C	5, 7, 8, 10, 15, 19, 22, 28, 30, 32, 42, 44
CEA470M16	C	6
CEA470M10	C	9, 27, 33- 35
CQMA152J50	C	11
CQMA104J50	C	12
CQMA102J50	C	13, 14
CQMA333J50	C	16
CQMA822J50	C	17
CCDRH221J50	C	18, 21
CCDRH121J50	C	20
CCDCH270J50	C	25, 26
CQMA103J50	C	36, 38
CQMA472J50	C	37, 39
CEANL100M16NP	C	40
CEANL100M16	C	41
CCDSL561J50	C	43
CCDSL151J50	C	45
VTL-043	L	1- 3 470u
VTF-054	VL	1
VSS-025	X	1 8.4672MHz

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

HPHB(VWY-043) Parts list 1

(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
RD1/6PS□□□J	R	1- 4
VCS-012	VR	1
VCG-025	C	1
VKN-143		Headphone jack

KDCB(VWG-104) Parts list 1

(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
PD4038	Z	1
PD4042	Z	2
MSL915RS	Z	3- 7
TC40H004P	Z	8
TC40H010P	Z	9
DTC124F	Z	10- 13
DTA124F	Z	14- 18
1S2473	D	1- 9
TLUG154	D	10- 15
VCN-102	R	1 4P 3.3k
VCN-101	R	2 4P 10k
RD1/6PS□□□J	R	3- 6
RD1/4VM□□□J	R	7, 8
CCDSL300J50	C	1, 2
CEA101M10	C	3
CKDYF223Z50	C	4, 10
CKDYF473Z50	C	5- 9
VTH-004	L	1, 2 Ferrite bead
VSS-026	X	1 3.58MHz
VSG-014	SW	1- 16
VAW-001		FL display

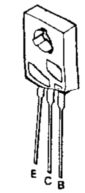
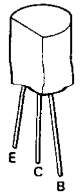
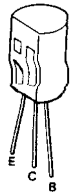
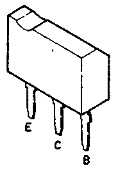
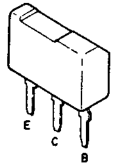
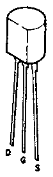
RMCN(VWY-048) Parts list 1

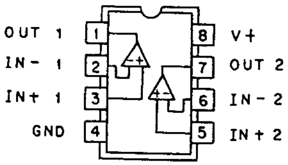
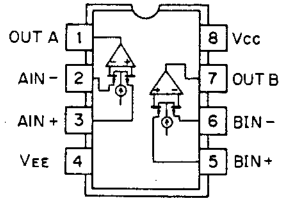
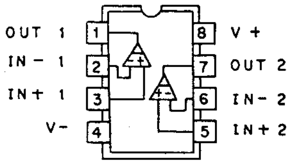
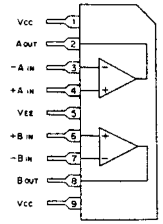
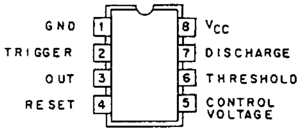
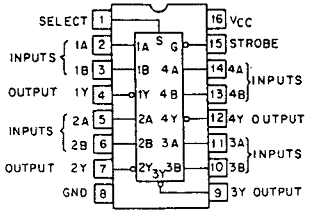
(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
RD1/6PS101J	R	1- 5
CCDSL101J50	C	1- 5
VKN-140		DIN Socket 5P

TSUB(VWG-112) Parts list 1

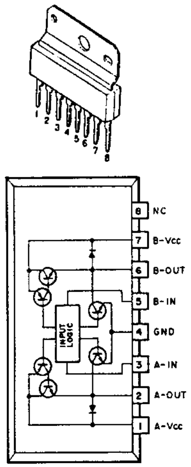
(MK)(Part No.)	(IT)	(REF Nos. & DESCRIPTIONS)
SN74LS00N (HD74LS00P)	Z	1
NE555P	Z	2
RD1/4VM□□□J	R	1
CEA470M10	C	1
CKDYF223Z50	C	2, 4
CEAR47M50	C	3

4.11 TR & ICs

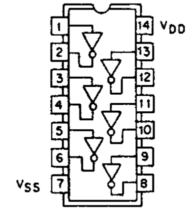
2SA1096 2SB1008 2SC2497 2SD1379 2SD1380		2SA817 2SA933LN 2SA1015 2SC1627 2SC1645 2SC1740LN 2SC1815		2SA965 2SC2060	
2SC2021LN		2SD1225M		2SK117	

μPC4558C TL082CP NE5532P NJM4560DX	 OUT 1 IN− 1 IN+ 1 GND 1 2 3 4 8 7 6 5 V+ OUT 2 IN− 2 IN+ 2	LF353N	 OUT A AIN − AIN + VEE 1 2 3 4 8 7 6 5 Vcc OUT B BIN − BIN +
LM393P	 OUT 1 IN − 1 IN+ 1 V− 1 2 3 4 8 7 6 5 V + OUT 2 IN− 2 IN + 2	NJM4558S	 Vcc AOUT −AIN +AIN VEE +BIN −BIN BOUT Vcc 1 2 3 4 5 6 7 8 9
NE555P	 GND TRIGGER OUT RESET 1 2 3 4 8 7 6 5 VCC DISCHARGE THRESHOLD CONTROL VOLTAGE	SN74LS157N	 SELECT INPUTS 1A 1B OUTPUT 1Y INPUTS 2A 2B OUTPUT 2Y GND 1 2 3 4 5 6 7 8 S G 1A 1B 1Y 2A 2B 2Y 3Y 4A 4B 4Y 3A 3B 16 15 14 13 12 11 10 9 VCC STROBE 4A 4B INPUTS 4Y OUTPUT 3A 3B INPUTS 3Y OUTPUT

MB3716


1
2
3
4
5
6
7
8
NC
B-Vcc
B-OUT
B-IN
GND
A-IN
A-OUT
A-Vcc
INPUT LOGIC

TC40H004P



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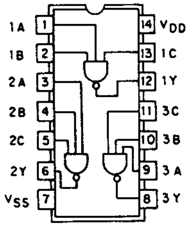
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1B
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2B
2C
2Y
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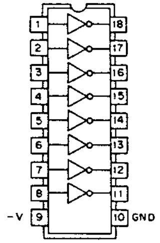
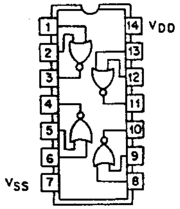
VDD
1C
1Y
3C
3B
3A
3Y

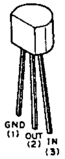
MSL915RS



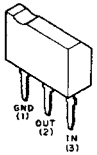
TC4001BP



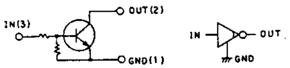
DTC124N
DTA124N


GND (1)
OUT (2)
IN (3)

DTC124F
DTA124F


GND (1)
OUT (2)
IN (3)

DTC124N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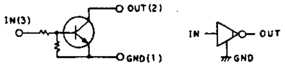
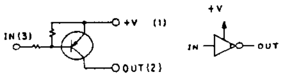
OUT(2)
GND(1)
IN
OUT
GND

DTC124F


IN(3)
OUT(2)
GND(1)
IN
OUT
GND

DTA124N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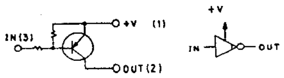
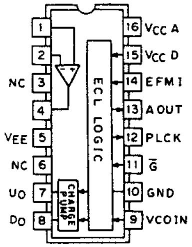
+V (1)
OUT(2)
+V
IN
OUT

DTA124F


IN(3)
+V (1)
OUT(2)
+V
IN
OUT

TD6315P


NC
VEE
NC
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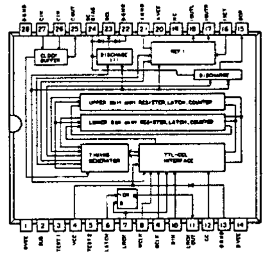
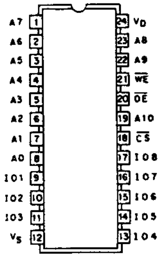
DO
VCC A
VCC D
EFMI
AOUT
PLCK
G
GND
VCOIN
ECL LOGIC
CHARGE PUMP

CX-20017



HM6116P-4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A6
A5
A4
A3
A2
A1
A0
IO1
IO2
IO3
VS
VD
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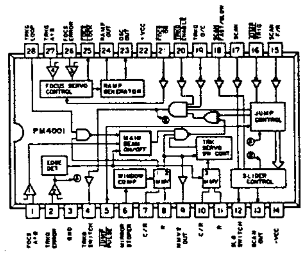
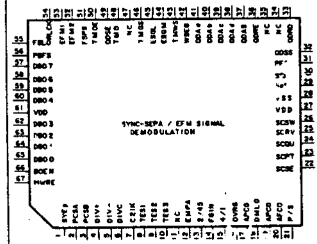
A9
WE
OE
A10
CS
IO8
IO7
IO6
IO5
IO4

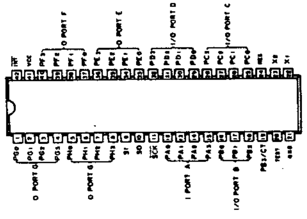
PM4001



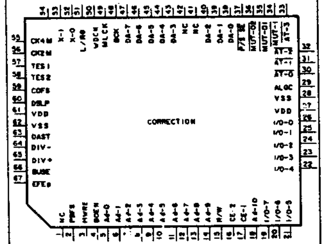
TC9178F


SYNC-SEPA / EFM SIGNAL DEMODULATION

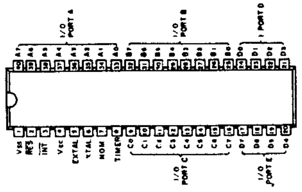
PD4038
PD4042



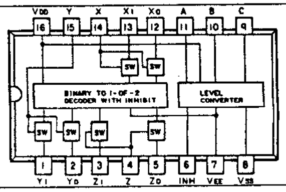
TC9179F


CORRECTION

PD3007

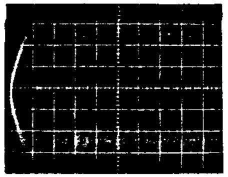


µPD4053BC

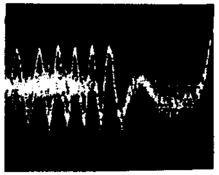

VDD
Y
X
X1
X0
A
B
C
BINARY TO 1-OF-2 DECODER WITH INHIBIT
LEVEL CONVERTER
SW
Y1
Y0
Z1
Z
Z0
INH
VEE
VSS

4.12 WAVEFORMS

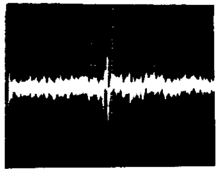
PREB TP1 MODE; PLAY
V: PROBE 1 : 1 5mV/div H: 0.5msec/div



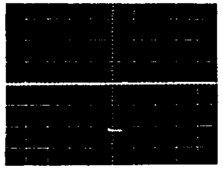
PREB N37-1 MODE; PLAY (TRKG OFF)
V: 50mV/div H: 5msec/div



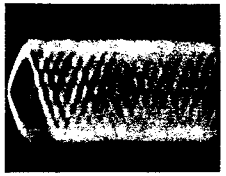
SVCT Z3-26 MODE; PLAY
V: 10mV/div H: 5msec/div



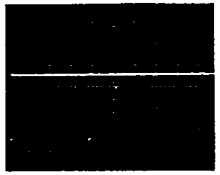
SVCT Z3-5 MODE; SLOW SCAN REV
V: 0.2V/div H: 5msec/div



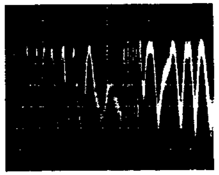
PREB TP3 MODE; PLAY
V: PROBE 1 : 1 5mV/div H: 0.5msec/div



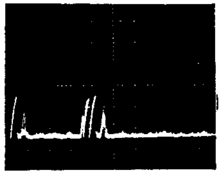
SVCT Z3-11 MODE; SLOW SCAN FWD
V: 0.2V/div H: 2msec/div



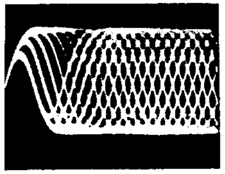
PREB TP5 MODE; PLAY (TRKG OFF)
V: 20mV/div H: 5msec/div



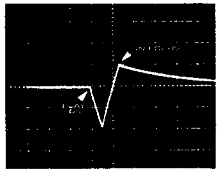
SVCT Z3-10 MODE; SLOW SCAN FWD
V: 0.2V/div H: 2msec/div



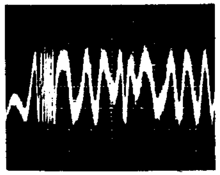
PREB N32-2 MODE; PLAY
V: 10mV/div H: 0.5msec/div



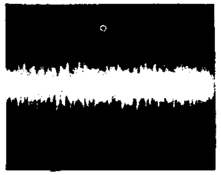
SVCT Z3-24 MODE; PUSH PLAY KEY
V: 0.1V/div H: 0.2msec/div



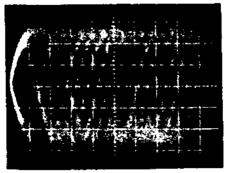
PREB N36-1 MODE; PLAY (TRKG OFF)
V: 50mV/div H: 5msec/div



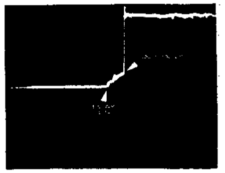
SVCT Z3-2 MODE; PLAY
V: 20mV/div H: 5msec/div



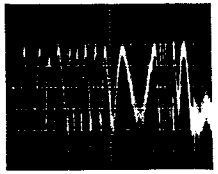
PREB TP2 MODE; PLAY
V: PROBE 1 : 1 5mV/div H: 0.5msec/div



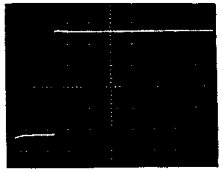
SVCT Z3-27 MODE; PLAY
V: 0.1V/div H: 0.2sec/div



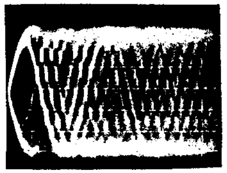
PREB TP6 MODE; PLAY (TRKG OFF)
V: 20mV/div H: 5msec/div



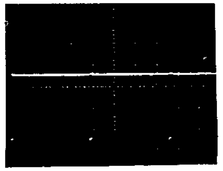
SVCT Z3-9 MODE; MIN/INDEX SEARCH
V: 0.2V/div H: 0.5msec/div



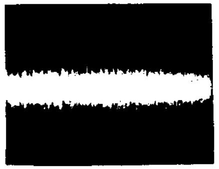
PREB TP4 MODE; PLAY
V: PROBE 1 : 1 5mV/div H: 0.5msec/div



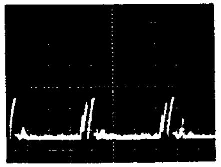
SVCT Z3-11 MODE; SLOW SCAN REV
V: 0.1V/div H: 2msec/div



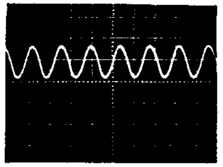
SVCT Z3-1 MODE; PLAY
V: 50mV/div H: 2msec/div



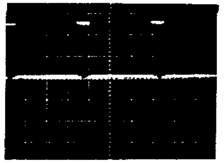
SVCT Z3-10 MODE; SLOW SCAN REV
V: 0.2V/div H: 2msec/div



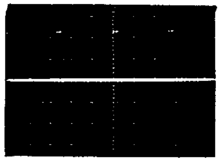
SVCT Z8-5 MODE; STAND-BY
V: 0.2V/div H: 0.2μsec/div



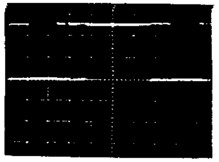
SVCT Z8-16 MODE; STAND-BY
V: 0.2V/div H: 5msec/div



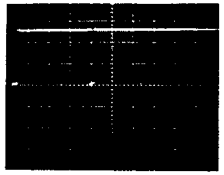
SVCT Z8-18 MODE; PLAY
V: 0.2V/div H: 5msec/div



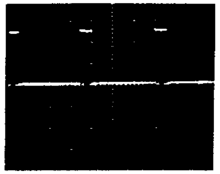
SVCT Z8-22 MODE; PLAY
V: 0.2V/div H: 2msec/div



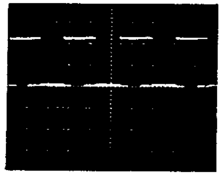
SVCT Z8-8 MODE; SLOW SCAN FWD
V: 0.2V/div H: 0.2μsec/div



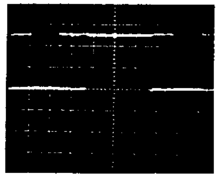
SVCT Z8-17 MODE; STAND-BY
V: 0.2V/div H: 5msec/div



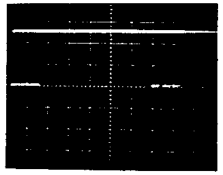
SVCT Z8-19 MODE; PLAY (after SLOW REV)
V: 0.2V/div H: 5msec/div



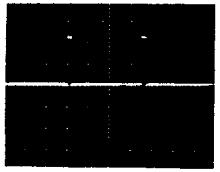
SVCT Z8-23 MODE; PLAY
V: 0.2V/div H: 2msec/div



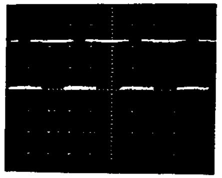
SVCT Z8-15 MODE; PLAY
V: 0.2V/div H: 2msec/div



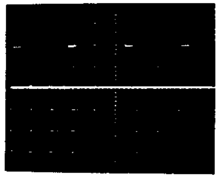
SVCT Z8-18 MODE; STAND-BY
V: 0.2V/div H: 5msec/div



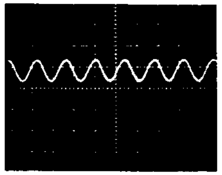
SVCT Z8-20 MODE; PLAY
V: 0.2V/div H: 5msec/div



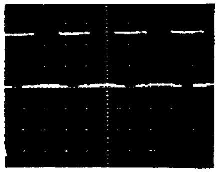
SVCT Z8-29 MODE; PLAY
V: 0.2V/div H: 5msec/div



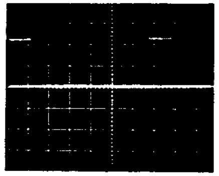
SVCT Z8-6 MODE; STAND-BY
V: 0.2V/div H: 0.2μsec/div



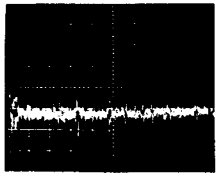
SVCT Z8-16 MODE; PLAY
V: 0.2V/div H: 5msec/div



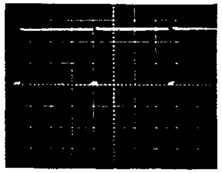
SVCT Z8-21 MODE; PLAY
V: 0.2V/div H: 2msec/div



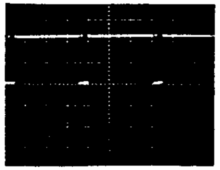
SVCT N13-1 MODE; SLOW SCAN FWD
V: 0.2V/div H: 2msec/div



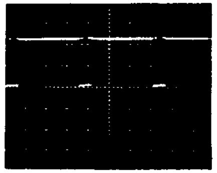
SVCT Z8-8 MODE; SLOW SCAN REV
V: 0.2V/div H: 0.2μsec/div



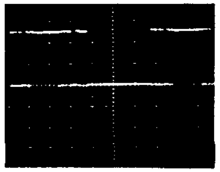
SVCT Z8-17 MODE; PLAY
V: 0.2V/div (after MIN/INDEX
H: 5msec/div SEARCH)



SVCT Z8-20 MODE; PUSH STOP, TS?REV, MS?REV.
V: 0.2V/div H: 5msec/div

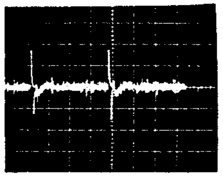


SVCT Z8-24 MODE; PLAY
V: 0.2V/div H: 2msec/div



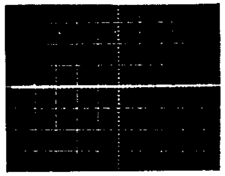
SVCT N13-3 MODE; SLOW SCAN REV

V: 0.5V/div H: 2msec/div



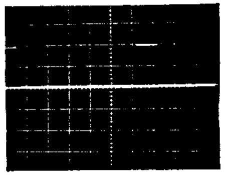
DCDR Z1-24 MODE; PLAY

V: 0.2V/div H: 5msec/div



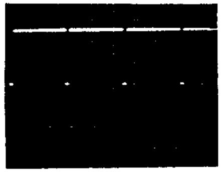
DCDR Z1-33 MODE; PLAY

V: 0.2V/div H: 2msec/div



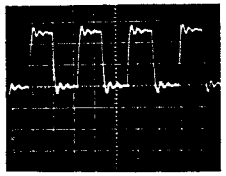
DCDR Z1-56 MODE; PLAY

V: 0.2V/div H: 50μsec/div



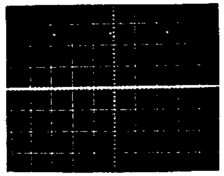
DCDR Z1-7 MODE; PLAY

V: 0.2V/div H: 0.2μsec/div



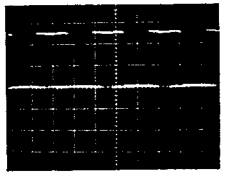
DCDR Z1-29 MODE; PLAY

V: 0.2V/div H: 5msec/div



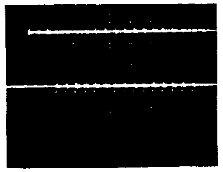
DCDR Z1-38 MODE; PLAY

V: 0.2V/div H: 5msec/div



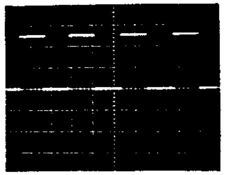
DCDR Z1-52 MODE; PLAY

V: 0.2V/div H: 0.5μsec/div



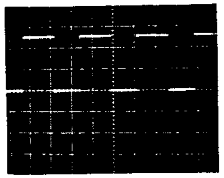
DCDRZ1-20 MODE; PLAY

V: 0.2V/div H: 50μsec/div



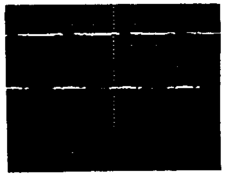
DCDR Z1-31 MODE; PLAY

V: 0.2V/div H: 50μsec/div



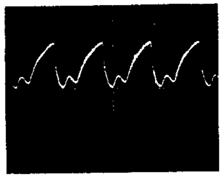
DCDR Z1-40 MODE; PLAY

V: 0.2V/div H: 5msec/div



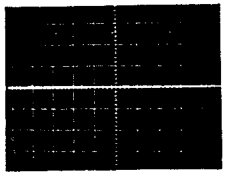
DCDR Z1-54 MODE; PLAY

V: 0.2V/div H: 0.1μsec/div



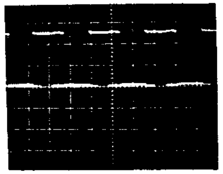
DCDR Z1-25 MODE; PLAY

V: 0.2V/div H: 5msec/div



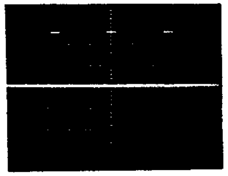
DCDR Z1-37 MODE; PLAY

V: 0.2V/div H: 5msec/div



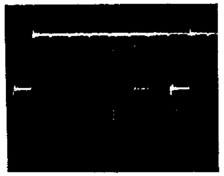
DCDR Z1-41 MODE; PLAY

V: 0.2V/div H: 5msec/div



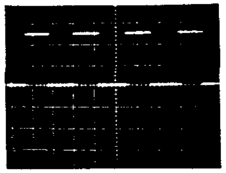
DCDR Z1-66 MODE; PLAY

V: 0.2V/div H: 0.5μsec/div



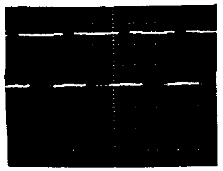
DCDR Z1-19 MODE; PLAY

V: 0.2V/div H: 50μsec/div



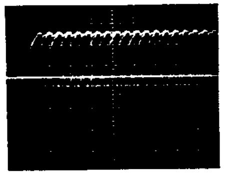
DCDR Z1-39 MODE; PLAY

V: 0.2V/div H: 5msec/div



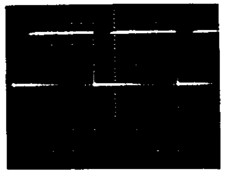
DCDR Z1-53 MODE; PLAY

V: 0.2V/div H: 0.5μsec/div

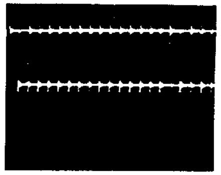


DCDR Z1-67 MODE; PLAY

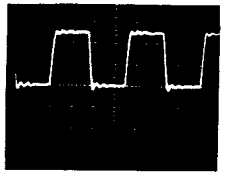
V: 0.2V/div H: 1μsec/div



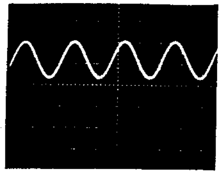
DCDR Z2-5~14 MODE; PLAY
V: 0.2V/div H: 1μsec/div



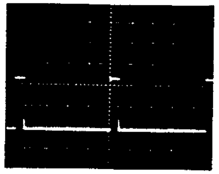
DCDR Z2-48 MODE; PLAY
V: 0.2V/div H: 0.2μsec/div



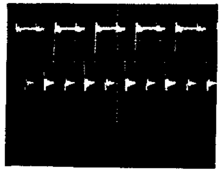
DCDR Z2-53 MODE; STAND-BY
V: 0.2V/div H: 50nsec/div



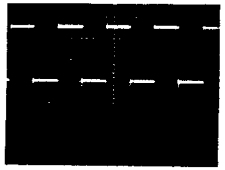
AUDF Z2-15 MODE; PLAY
V: 0.2V/div H: 5μsec/div



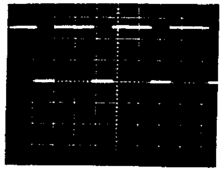
DCDR Z2-17 MODE; PLAY
V: 0.2V/div H: 0.5μsec/div



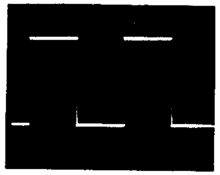
DCDR Z2-50 MODE; PLAY
V: 0.2V/div H: 5μsec/div



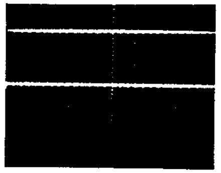
DCDR Z2-59 MODE; PLAY
V: 0.2V/div H: 50μsec/div



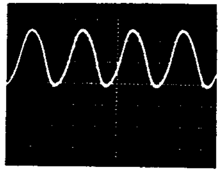
AUDF Z2-11 MODE; PLAY
V: 0.2V/div H: 5μsec/div



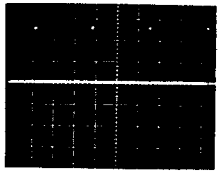
DCDR Z2-47 MODE; PLAY
V: 0.2V/div H: 2μsec/div



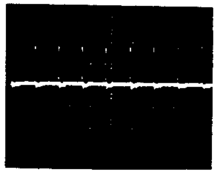
DCDR Z2-52 MODE; STAND-BY
V: 0.2V/div H: 50nsec/div



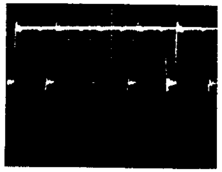
DCDR Z2-60 MODE; PLAY
V: 0.2V/div H: 50μsec/div



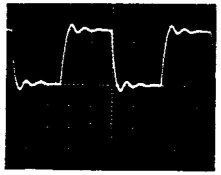
AUDF Z2-17 MODE; PLAY
V: 0.2V/div H: 5μsec/div



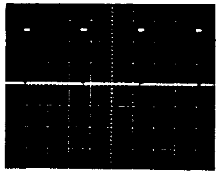
DCDR Z2-15 MODE; PLAY
V: 0.2V/div H: 0.5μsec/div



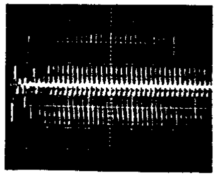
DCDR Z2-56 MODE; PLAY
V: 0.2V/div H: 0.1μsec/div



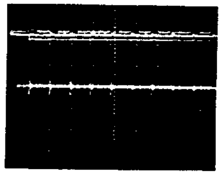
DCDR Z2-63 MODE; PLAY
V: 0.2V/div H: 50μsec/div



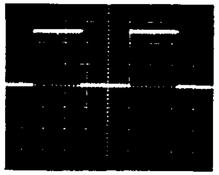
DCDR Z3-2 MODE; PLAY
V: 20mV/div H: 1μsec/div



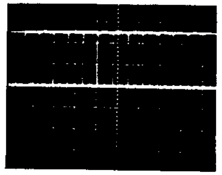
DCDR Z2-25 MODE; PLAY
V: 0.2V/div H: 1μsec/div



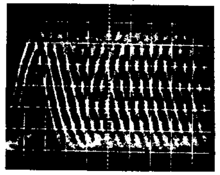
DCDR Z2-51 MODE; PLAY
V: 0.2V/div H: 5μsec/div



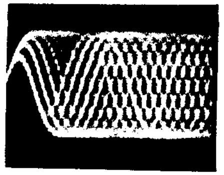
AUDF Z2-10 MODE; PLAY
V: 0.2V/div H: 1μsec/div



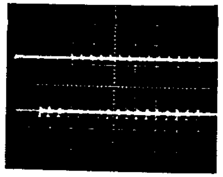
DCDR Z5-1 MODE; PLAY
V: RANGE AC 20mV/div H: 0.5μsec/div



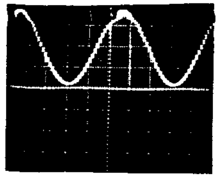
DCDR N10-2 MODE; PLAY
V: RANGE AC 10mV/div H: 0.5μsec/div



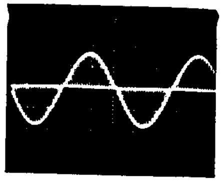
DCDR Z5-8 MODE; PLAY
V: RANGE AC 0.2V/div H: 0.5μsec/div



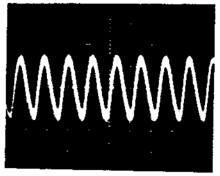
AUDF Z4-1 MODE; 1 kHz PLAY
V: 0.2V/div H: 0.2msec/div



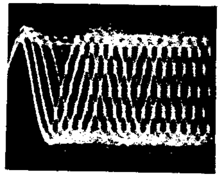
AUDF Z4-7 MODE; 1 kHz PLAY
V: 0.2V/div H: 0.2msec/div



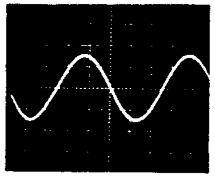
DCDR Z3-9 MODE; PLAY
V: RANGE AC 20mV/div H: 50nsec/div



DCDR Q3-E MODE; PLAY
V: RANGE AC 50mV/div H: 0.5μsec/div

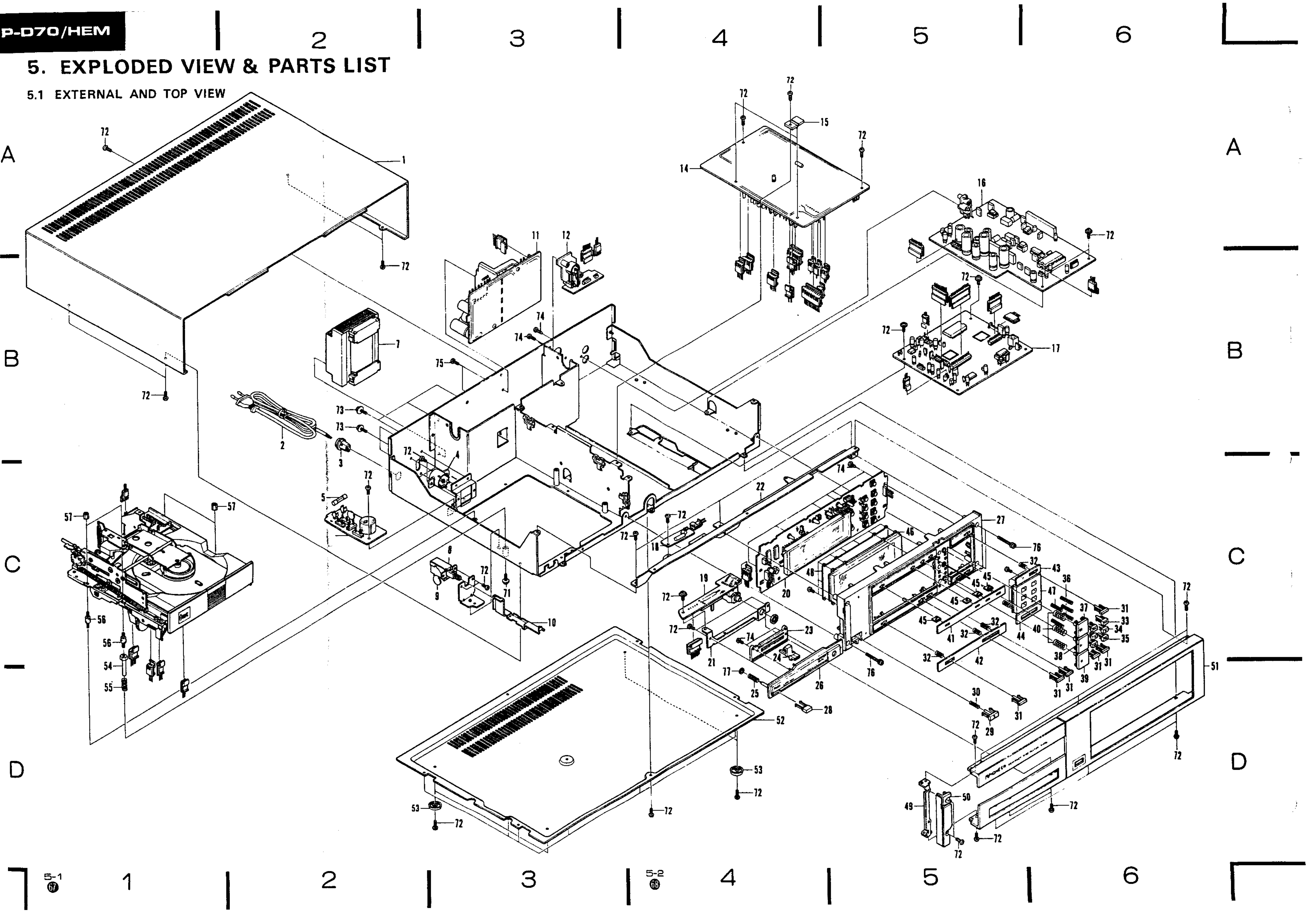


AUDF Z6-7 MODE; 1 kHz PLAY
V: 0.2V/div H: 0.2msec/div



5. EXPLODED VIEW & PARTS LIST

5.1 EXTERNAL AND TOP VIEW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NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

P-D70/HEM(TOP) Parts list 1

(MK)	(KY)	(Part Number)	(DESCRIPTION)
	1	VXA-190	Bonnet
⚠	2	VDG-019	Power cord
	3	VEC-152	Cord stopper
⚠	4	VSB-001	Voltage selector
⚠	5	VEK-012	Fuse 250mA
	6	VWR-047	FUSB
⚠	7	VTT-038	Power transformer
⚠	8	VSA-006	Power switch
⚠	9	VCG-018	Capacitor
	10		Joint
	11	VWR-041	SYPS
	12		RMCN
	13		
	14	VWS-042	SVCT
	15		PCB hinge
	16	VWK-005	AUDF
	17	VWV-050	DCDR
	18		LMPB
	19		HPHB
	20	VWG-104	KDCB
	21		Angle
	22		Front frame
	23	VNL-236	Holder
	24	VAC-222	Slide knob
	25	VBH-109	Spring
	26	VNK-181	PH panel
	27	VNK-212	Key panel
	28	VXA-167	Power button
	29	VXA-168	OPEN/CLOSE button
	30	VBH-113	Spring
	31	VAC-214	Button
	32	VBH-106	Spring
	33	VAC-229	TRACK button
	34	VAC-230	MIN button
	35	VAC-231	SCAN button
	36	VBH-107	Spring
	37	VXA-169	PAUSE button
	38	VXA-170	PLAY button
	39	VXA-171	STOP button
	40	VBH-108	Spring
	41	VAK-035	Aluminum panel A
	42	VAK-036	Aluminum panel B
	43	VAK-037	Aluminum panel C
	44	VAK-038	Aluminum panel D
	45	VNK-177	LED lens
	46	VNK-214	Acryl window
	47	VNK-215	Acryl key panel
	48		Filter
	49		Holder
	50	VNK-180	Side escutcheon
	51	VAH-044	Front panel
	52		Bottom cover
	53	VNL-218	Foot
	54	VLL-236	Shaft
	55	VBH-112	Spring

P-D70/HEM(TOP) Parts list 2

(MK)	(KY)	(Part Number)	(DESCRIPTION)
	56	VEB-061	Insulator
	57	VLL-233	Nut
	58		
	59		
	60		
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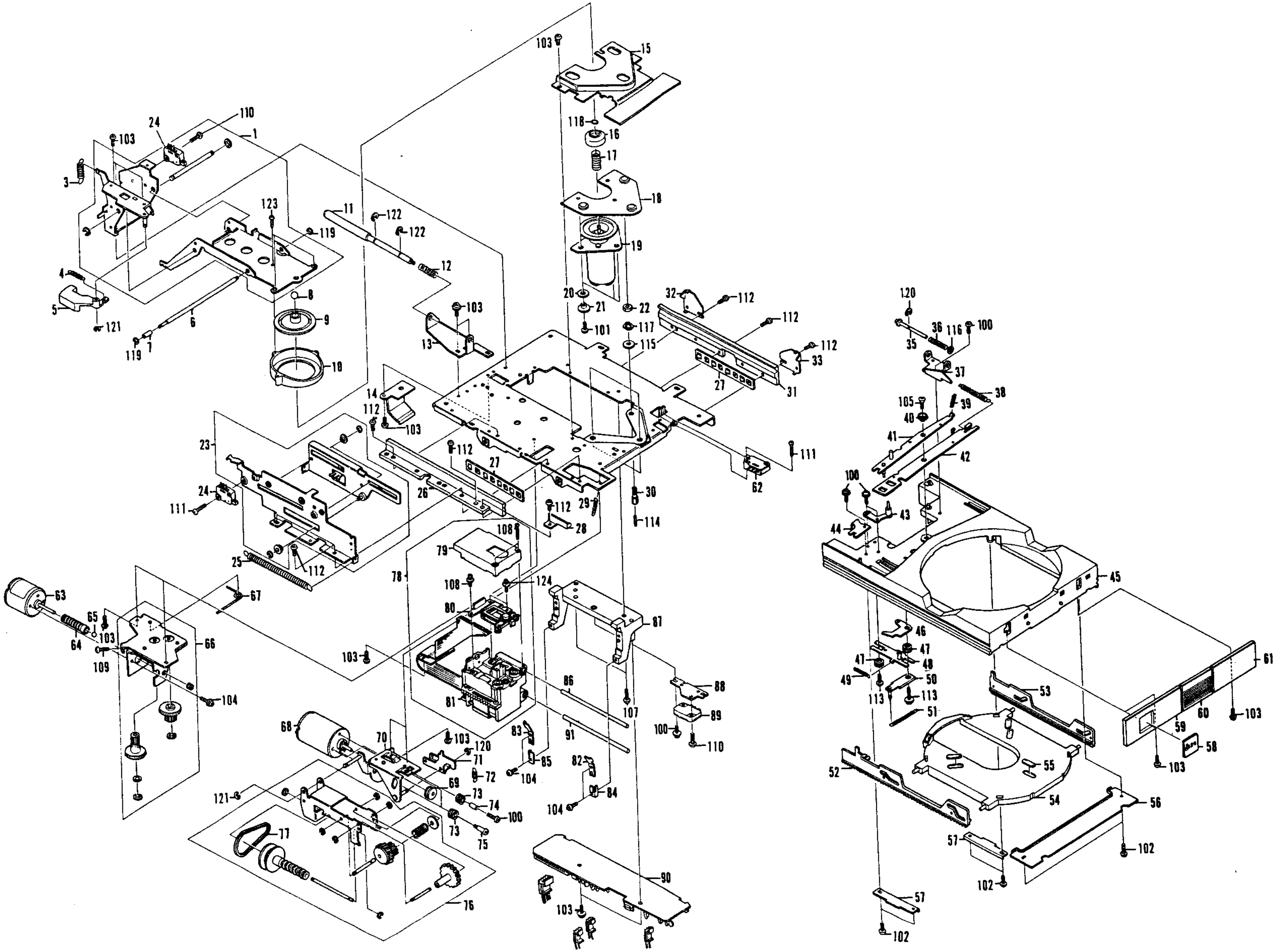
	70		
	71	AMZ30P100FMC	
	72	BCZ30P060FZK	
	73	PCZ40P060FZK	
	74	VBZ30P060FZK	
	75	VCZ30P060FMC	
	76	VCZ30P200FMC	
	77	YS24FBT	

5.2 MECHANISM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NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

P-D70/HEM(MECH) Parts list 1

(MK)	(KY)	(Part Number)	(DESCRIPTION)
	1	VXA-179	Clamper holder
	2		
	3	VBH-098	
	4	VBH-097	Spring
	5	VNT-025	Caddy lock
	6	VLL-198	Clamper shaft
	7	VLL-199	Roller
	8	VNH-043	Steel ball
	9	VNL-208	Clamper
	10	VNL-209	Clamper guide
	11		Caddy clamp shaft
	12		Spring
	13		Caddy clamp
	14		PCB guide
	15		Blind
	16	VLL-210	Taper wheel
	17	VBH-104	Spring
	18		Motor holder
	19	VXM-033	SPDL motor
	20	VEF-023	Spring
	21	VLL-211	Collar
	22	VLA-061	M5 nut
	23	VXA-180	Slider holder
	24	VSF-009	Micro switch
	25	VBH-099	Spring
	26	VNG-010	Rail B
	27	VXA-178	Retainer ASS´Y
	28	VNE-472	Retainer holder C
	29	VBH-092	Spring
	30	VLL-209	Hight adj. screw
	31	VNG-009	Rail A
	32	VNE-470	Retainer holder A
	33	VNE-471	Retainer holder B
	34		
	35		Switch pin
	36	VBH-091	Spring
	37		Switch holder
	38	VBH-094	Spring
	39	VBH-114	Spring
	40	VLL-195	Link spacer
	41		Link B
	42		Link A
	43	VXA-149	Lock plate
	44		Caddy clamp
	45	VNT-032	Caddy
	46		Spacer B
	47	VLL-197	Spacer
	48		Link holder A
	49	VBH-096	Spring
	50		Lack arm
	51	VBH-101	Spring
	52	VNL-210	Rack L
	53	VNL-211	Rack R
	54	VNK-211	Tray
	55	VED-041	Disc guard

P-D70/HEM(MECH) Parts list 2

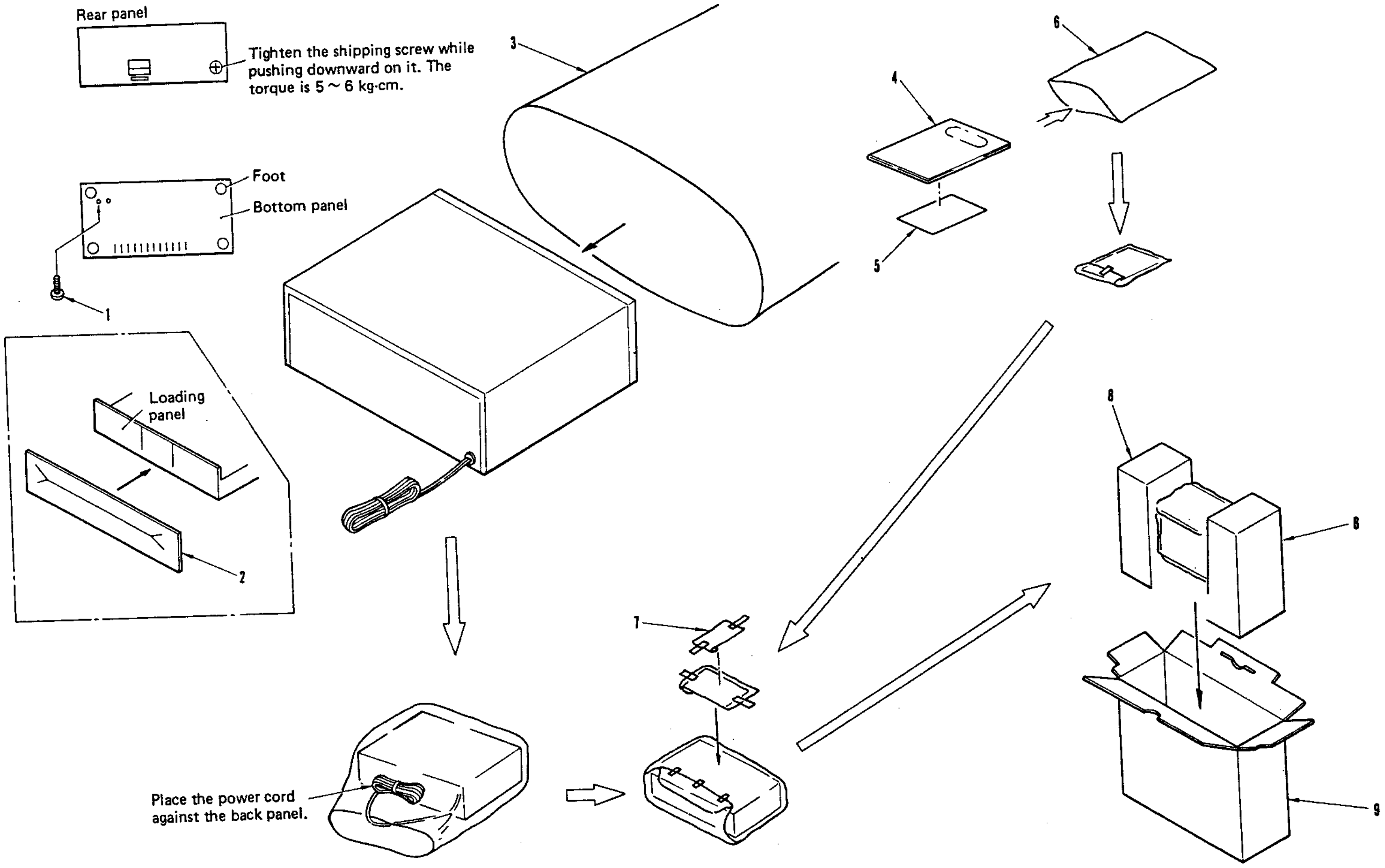
(MK)	(KY)	(Part Number)	(DESCRIPTION)
	56		Rack holder A
	57		Rack holder B
	58	VNK-163	CD badge
	59	VAH-045	Loading panel L
	60	VNK-213	Loading window
	61	VAH-046	Loading panel R
	62	VSF-009	Micro switch
	63	VXM-032	CARG motor
	64	VNL-214	Carriage worm
	65	VNH-026	Steel ball
	66	VXA-183	Gear unit
	67	VBH-105	Spring
	68	VXM-034	Loading motor
	69	VNL-207	Pulley
	70		Motor holder
	71		Clutch lever
	72	VBH-102	Spring
	73	VEB-050	Bushing
	74	VEF-022	Spacer
	75	VLL-183	Screw
	76	VXA-177	Worm holder
	77	VEB-058	Belt
	78	VWY-061	Pick up
	79	VNH-047	Cover
	80	VGX-044	Actuator ASS´Y
	81	VGX-045	CD body
	82	VNE-558	Shaft holder A
	83	VNE-559	Shaft holder B
	84	VNE-494	Shaft holder C
	85	VNE-495	Shaft holder D
	86	VLL-251	Slider shaft
	87		Slider base
	88		Limitter SW holder
	89	VSF-009	Micro-switch
	90	VWV-046	PREB
	91	VLL-252	Slider shaft B
	92		
	93		
	94		
	95		
	96		
	97		
	98		
	99		
	100	ACZ30P060FMC	
	101	AMZ30P060FMC	
	102	BCZ30P040FZK	
	103	BCZ30P060FZK	
	104	BMZ26P040FMC	
	105	CMZ30P060FMC	
	106	PBZ30P080FMC	
	107	PMA30P080FMC	
	108	PMZ26P100FMC	
	109	PMZ30P120FMC	
	110	VCZ26P060FMC	

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

P-D70/HEM(MECH) Parts list 3

(MK)	(KY)	(Part Number)	(DESCRIPTION)
	111	VCZ26P100FMC	
	112	VCZ30P080FZK	
	113	VCZ30P100FMC	
	114	ZMD30H200FBT	
	115	WB50FMC	
	116	WC30FMC	
	117	WW50FBT	
	118	YC25FBT	
	119	YE15FUC	
	120	YE20FUC	
	121	YE25FUC	
	122	YE40FUC	
	123	PBZ20P060FZK	
	124	PMB20P060FMC	

5.3 PACKING MATERIALS


Rear panel
Tighten the shipping screw while pushing downward on it. The torque is 5 ~ 6 kg-cm.
Foot
Bottom panel
1
Loading panel
2
3
4
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9
Place the power cord against the back panel.

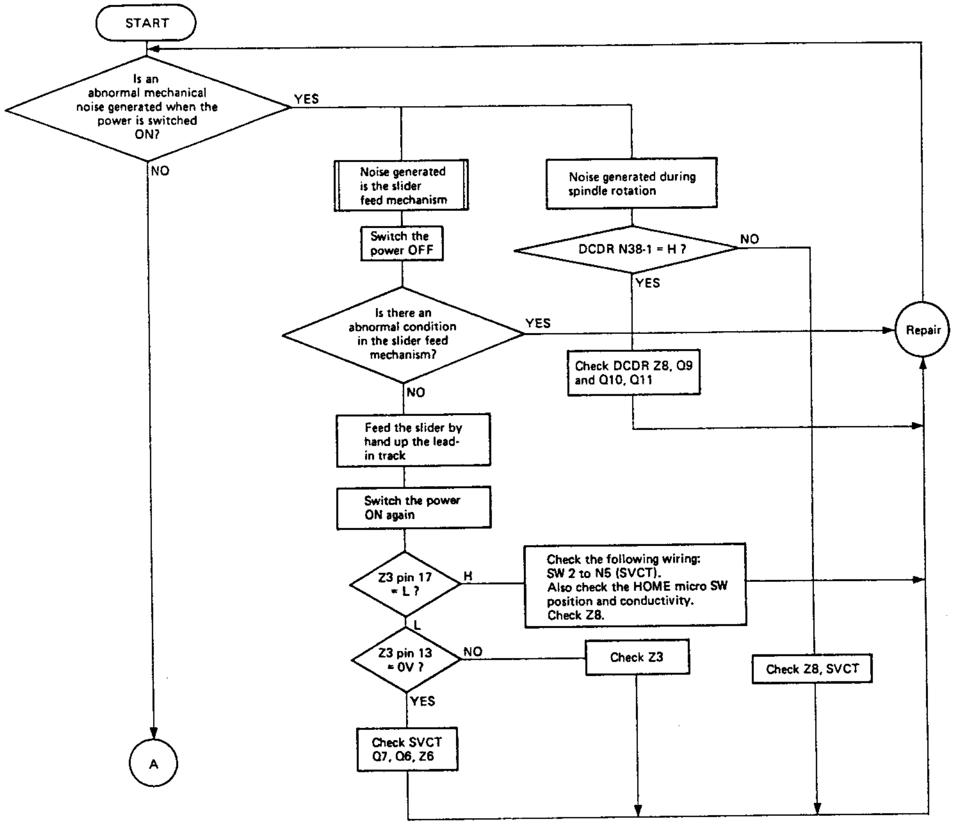
NOTES:

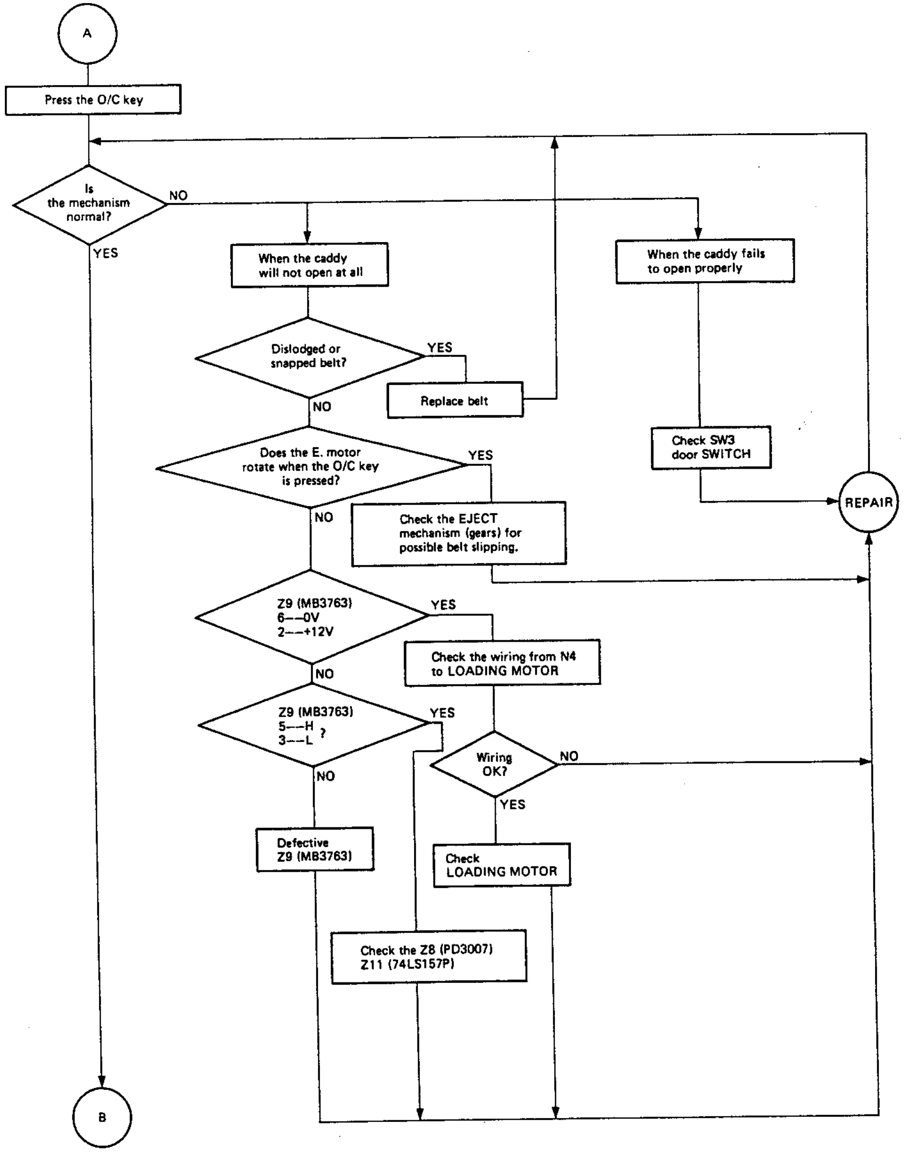
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

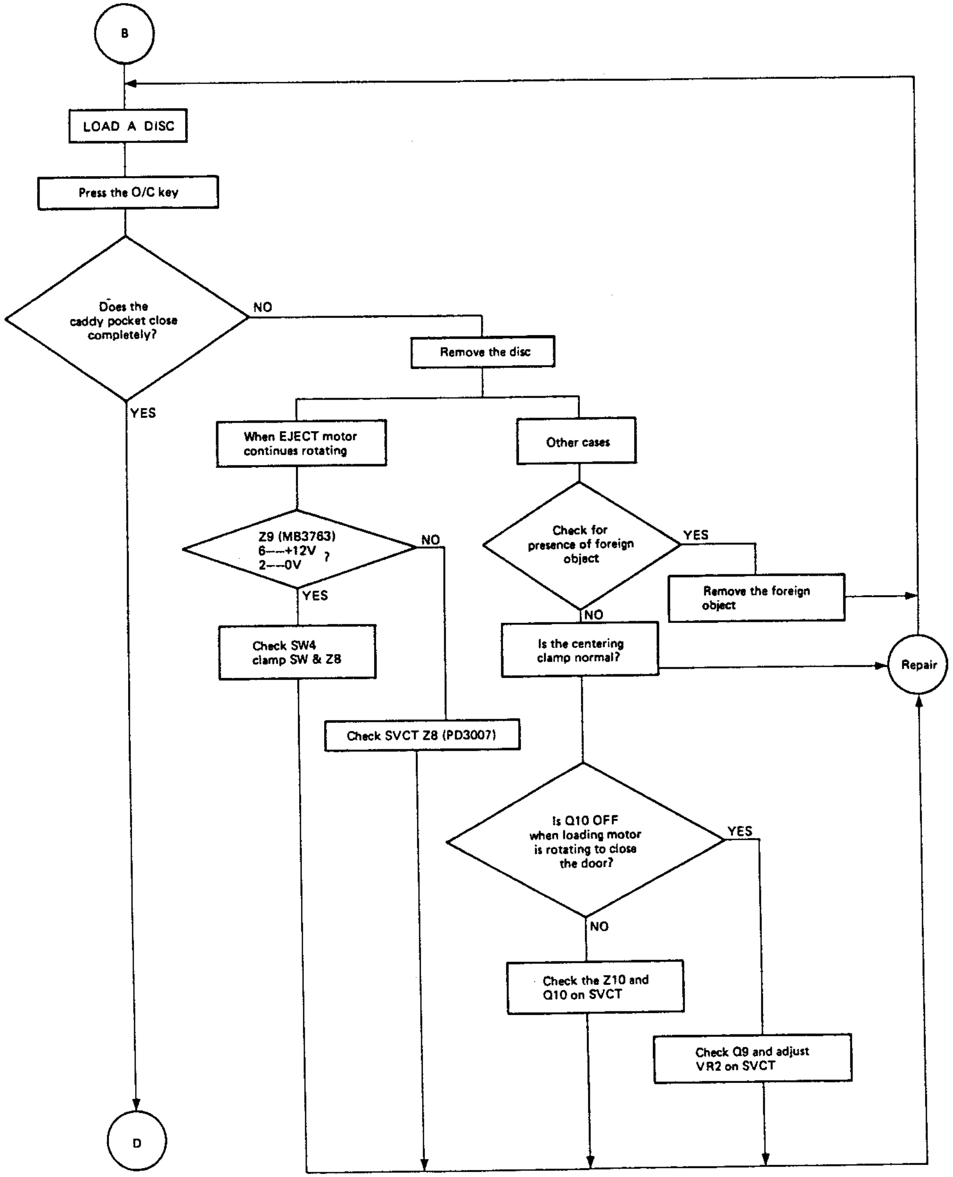
P-D70/HEM(PACKING) Parts list 1

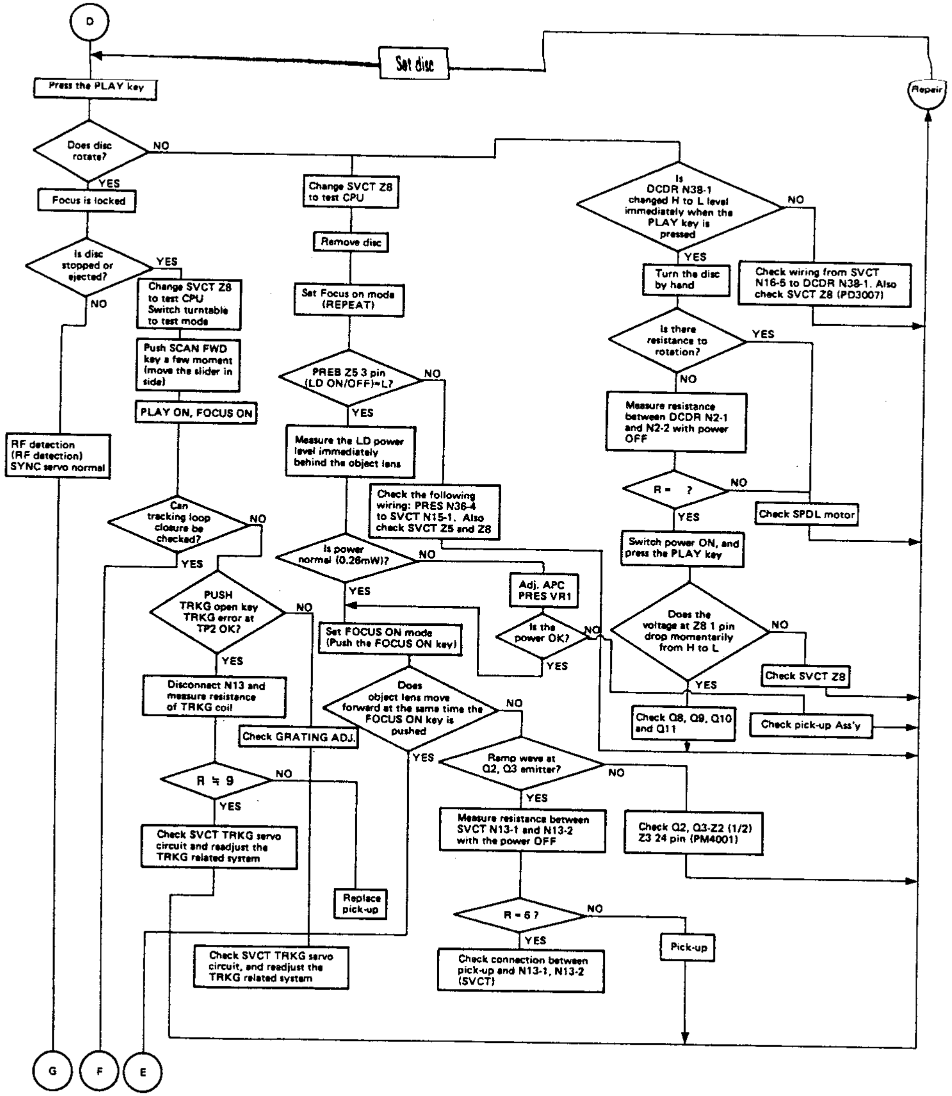
(MK)	(KY)	(Part Number)	(DESCRIPTION)
	1	BCZ30Y160FGN	
	2	VHA-087	Panel cushion
	3	VHA-043	Bag
	4	VRD-003	Operating instructions
	5		
	6	VHL-014	Polyethylene bag
	7	VDE-032	Connecting cord
	8	VHA-084	Side pad
	9	VHG-070	Packing case

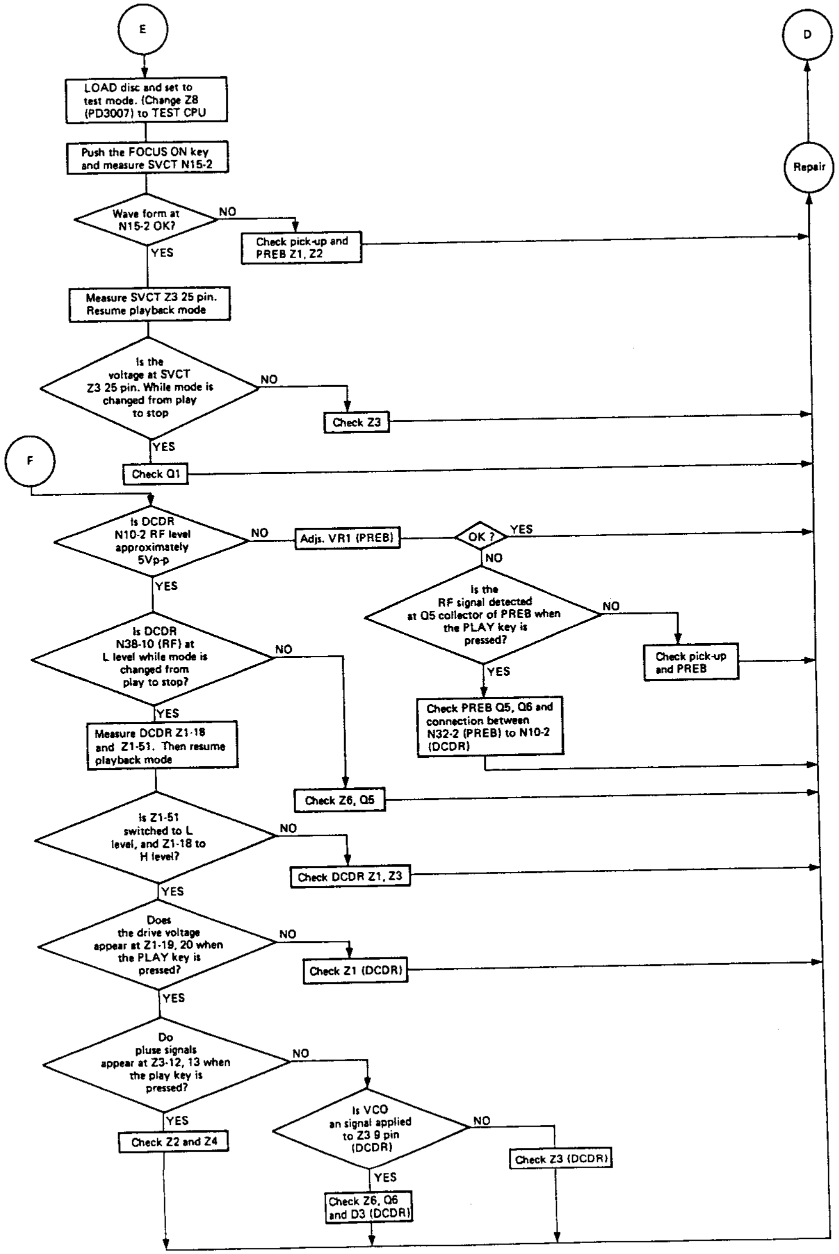
6. TROUBLE SHOOTING

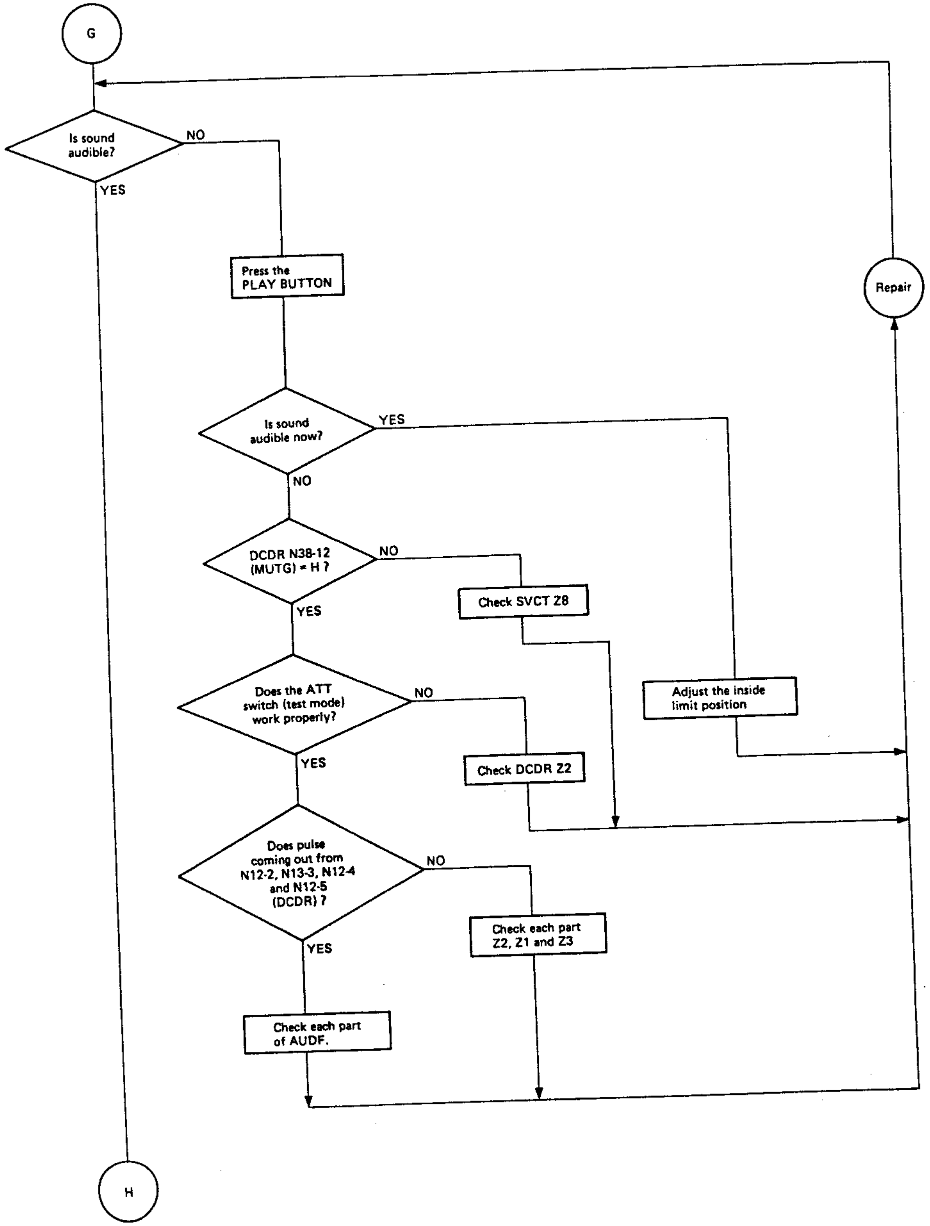

START
Is an abnormal mechanical noise generated when the power is switched ON?
YES
NO
Noise generated is the slider feed mechanism
Noise generated during spindle rotation
Switch the power OFF
DCDR N38-1 = H ?
NO
YES
Is there an abnormal condition in the slider feed mechanism?
YES
Repair
NO
Check DCDR Z8, Q9 and Q10, Q11
Feed the slider by hand up the lead-in track
Switch the power ON again
Z3 pin 17 = L ?
H
Check the following wiring: SW 2 to N5 (SVCT). Also check the HOME micro SW position and conductivity. Check Z8.
L
Z3 pin 13 = 0V ?
NO
Check Z3
Check Z8, SVCT
YES
Check SVCT Q7, Q6, Z6
A

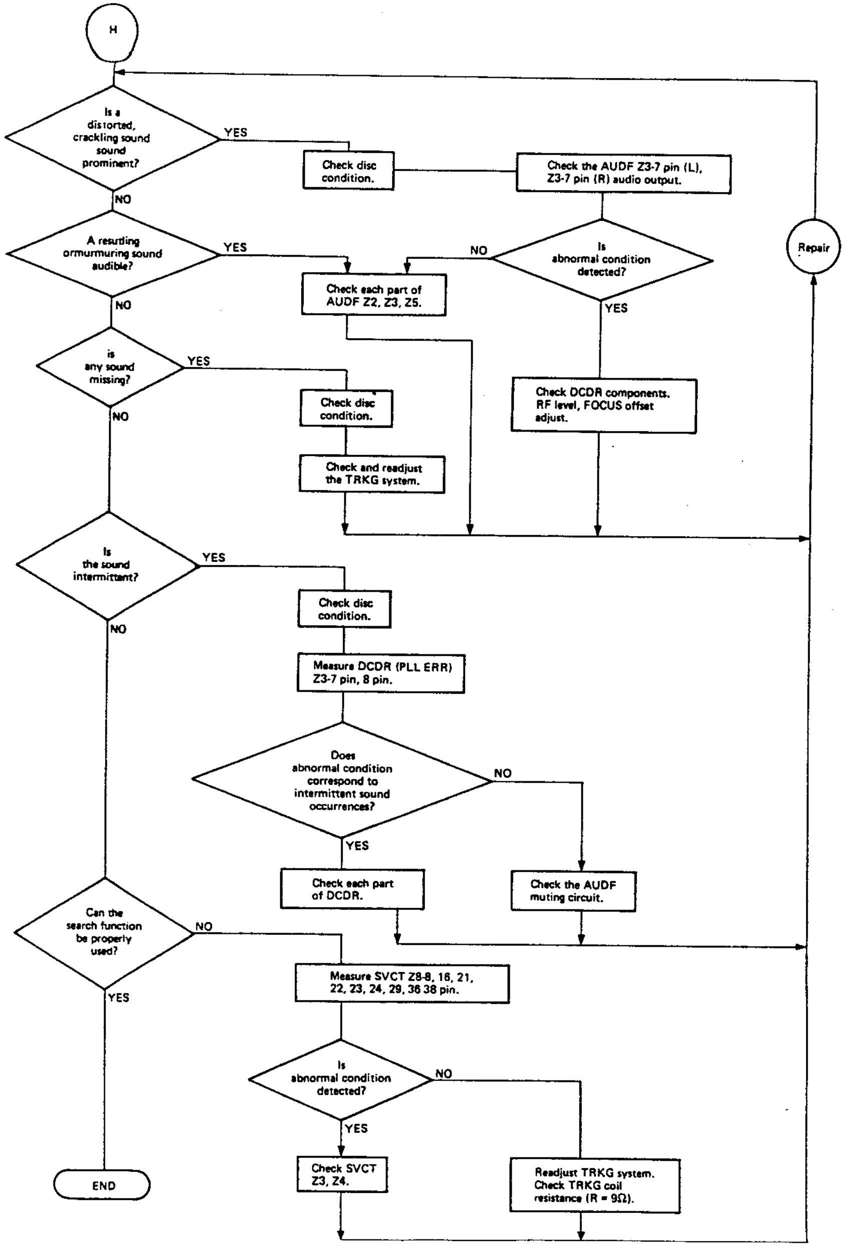

A
Press the O/C key
Is the mechanism normal?
NO
YES
When the caddy will not open at all
When the caddy fails to open properly
Dislodged or snapped belt?
YES
Replace belt
NO
Check SW3 door SWITCH
Does the E. motor rotate when the O/C key is pressed?
YES
REPAIR
NO
Check the EJECT mechanism (gears) for possible belt slipping.
Z9 (MB3763) 6—0V 2—+12V
YES
NO
Check the wiring from N4 to LOADING MOTOR
Z9 (MB3763) 5—H 3—L ?
YES
Wiring OK?
NO
NO
YES
Defective Z9 (MB3763)
Check LOADING MOTOR
Check the Z8 (PD3007) Z11 (74LS157P)
B


B
LOAD A DISC
Press the O/C key
Does the caddy pocket close completely?
NO
YES
Remove the disc
When EJECT motor continues rotating
Other cases
Z9 (MB3763) 6—+12V 2—0V ?
NO
YES
Check SW4 clamp SW & Z8
Check SVCT Z8 (PD3007)
Check for presence of foreign object
YES
NO
Remove the foreign object
Is the centering clamp normal?
Repair
Is Q10 OFF when loading motor is rotating to close the door?
YES
NO
Check the Z10 and Q10 on SVCT
Check Q9 and adjust VR2 on SVCT
D


D
Set disc
Repair
Press the PLAY key
Does disc rotate?
NO
YES
Focus is locked
Is disc stopped or ejected?
YES
NO
Change SVCT Z8 to test CPU Switch turntable to test mode
Push SCAN FWD key a few moment (move the slider in side)
PLAY ON, FOCUS ON
RF detection (RF detection) SYNC servo normal
Can tracking loop closure be checked?
NO
YES
PUSH TRKG open key TRKG error at TP2 OK?
NO
YES
Disconnect N13 and measure resistence of TRKG coil
Check GRATING ADJ.
R ≒ 9
NO
YES
Check SVCT TRKG servo circuit and readjust the TRKG related system
Replace pick-up
Check SVCT TRKG servo circuit, and readjust the TRKG related system
Change SVCT Z8 to test CPU
Remove disc
Set Focus on mode (REPEAT)
PREB Z5 3 pin (LD ON/OFF)=L?
NO
YES
Measure the LD power level immediately behind the object lens
Check the following wiring: PRES N36-4 to SVCT N15-1. Also check SVCT Z5 and Z8
Is power normal (0.26mW)?
NO
YES
Adj. APC PRES VR1
Is the power OK?
NO
YES
Set FOCUS ON mode (Push the FOCUS ON key)
Does object lens move forward at the same time the FOCUS ON key is pushed
NO
YES
Ramp wave at Q2, Q3 emitter?
NO
YES
Measure resistance between SVCT N13-1 and N13-2 with the power OFF
Check Q2, Q3-Z2 (1/2) Z3 24 pin (PM4001)
R = 6 ?
NO
YES
Check connection between pick-up and N13-1, N13-2 (SVCT)
Pick-up
Is DCDR N38-1 changed H to L level immediately when the PLAY key is pressed
NO
YES
Turn the disc by hand
Check wiring from SVCT N16-5 to DCDR N38-1. Also check SVCT Z8 (PD3007)
Is there resistance to rotation?
YES
NO
Measure resistance between DCDR N2-1 and N2-2 with power OFF
R = ?
NO
YES
Check SPDL motor
Switch power ON, and press the PLAY key
Does the voltage at Z8 1 pin drop momentarily from H to L
NO
YES
Check SVCT Z8
Check Q8, Q9, Q10 and Q11
Check pick-up Ass'y
G
F
E


E
LOAD disc and set to test mode. (Change Z8 (PD3007) to TEST CPU
Push the FOCUS ON key and measure SVCT N15-2
Wave form at N15-2 OK?
NO
Check pick-up and PREB Z1, Z2
YES
Measure SVCT Z3 25 pin. Resume playback mode
Is the voltage at SVCT Z3 25 pin. While mode is changed from play to stop
NO
Check Z3
YES
Check Q1
F
Is DCDR N10-2 RF level approximately 5Vp-p
NO
Adjs. VR1 (PREB)
OK ?
YES
NO
Is the RF signal detected at Q5 collector of PREB when the PLAY key is pressed?
NO
Check pick-up and PREB
YES
Check PREB Q5, Q6 and connection between N32-2 (PREB) to N10-2 (DCDR)
YES
Is DCDR N38-10 (RF) at L level while mode is changed from play to stop?
NO
Check Z6, Q5
YES
Measure DCDR Z1-18 and Z1-51. Then resume playback mode
Is Z1-51 switched to L level, and Z1-18 to H level?
NO
Check DCDR Z1, Z3
YES
Does the drive voltage appear at Z1-19, 20 when the PLAY key is pressed?
NO
Check Z1 (DCDR)
YES
Do pluse signals appear at Z3-12, 13 when the play key is pressed?
NO
Is VCO an signal applied to Z3 9 pin (DCDR)
NO
Check Z3 (DCDR)
YES
Check Z6, Q6 and D3 (DCDR)
YES
Check Z2 and Z4
Repair
D


G
Is sound audible?
NO
Press the PLAY BUTTON
Is sound audible now?
YES
Adjust the inside limit position
NO
DCDR N38-12 (MUTG) = H ?
NO
Check SVCT Z8
YES
Does the ATT switch (test mode) work properly?
NO
Check DCDR Z2
YES
Does pulse coming out from N12-2, N13-3, N12-4 and N12-5 (DCDR) ?
NO
Check each part Z2, Z1 and Z3
YES
Check each part of AUDF.
Repair
YES
H


H
Is a distorted, crackling sound sound prominent?
YES
Check disc condition.
Check the AUDF Z3-7 pin (L), Z3-7 pin (R) audio output.
NO
A resurling ormurmuring sound audible?
YES
NO
Is abnormal condition detected?
Repair
Check each part of AUDF Z2, Z3, Z5.
NO
YES
is any sound missing?
YES
Check disc condition.
Check DCDR components. RF level, FOCUS offset adjust.
NO
Check and readjust the TRKG system.
Is the sound intermittent?
YES
Check disc condition.
NO
Measure DCDR (PLL ERR) Z3-7 pin, 8 pin.
Does abnormal condition correspond to intermittent sound occurrences?
NO
YES
Check each part of DCDR.
Check the AUDF muting circuit.
Can the search function be properly used?
NO
Measure SVCT Z8-8, 16, 21, 22, 23, 24, 29, 36 38 pin.
YES
Is abnormal condition detected?
NO
YES
END
Check SVCT Z3, Z4.
Readjust TRKG system. Check TRKG coil resistance (R = 9Ω).

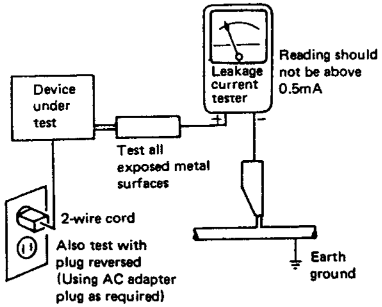
7. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Device under test
Leakage current tester
Reading should not be above 0.5mA
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

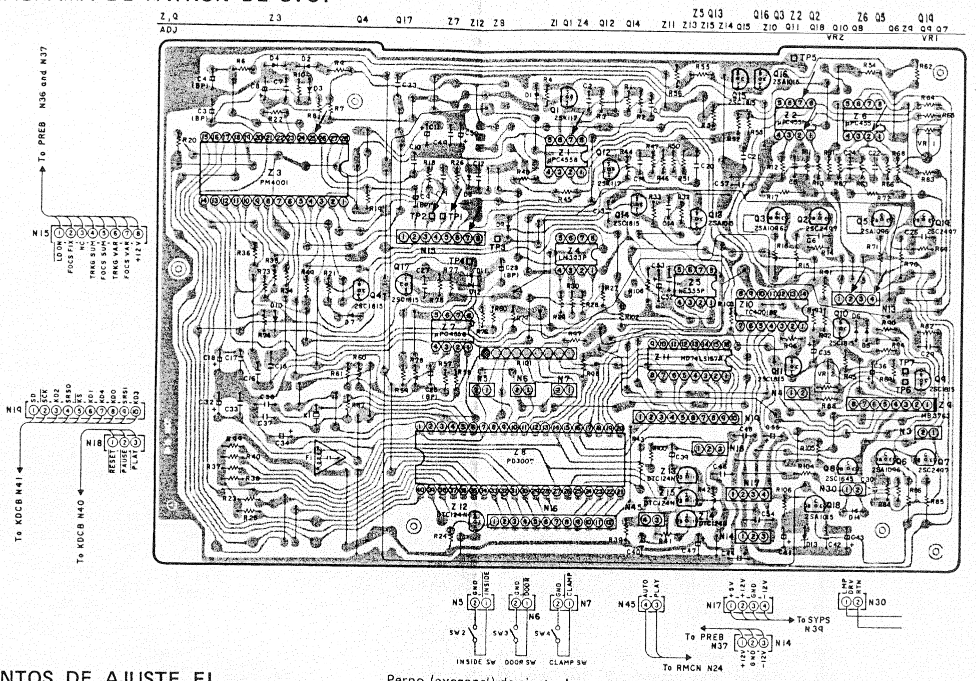
Electrical components having such features are identified by marking with a on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

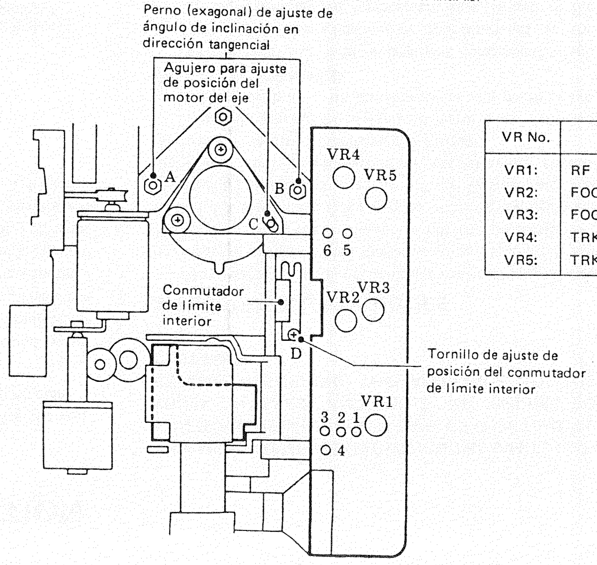
Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

8. AJUSTES ELECTRICOS

DIAGRAMA DE PATRON DE SVCT

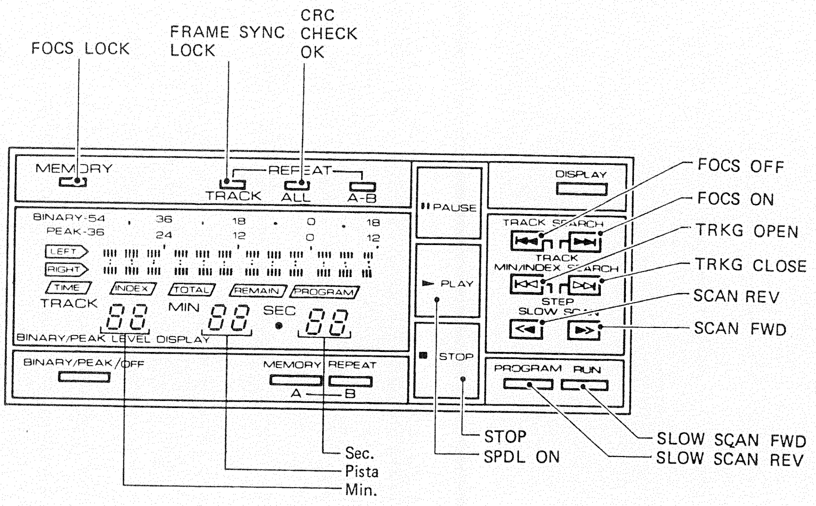

To PREB N36 and N37
N15
N19
N18
To KDCB N41
To KDCB N40
N5
N6
N7
N45
N17
N30
To SYPS N39
To PREB N37
N14
To RMCN N24
SW2
SW3
SW4
INSIDE SW
DOOR SW
CLAMP SW

PUNTOS DE AJUSTE EL MECANISMO Y PREB


Perno (exagonal) de ajuste de ángulo de inclinación en dirección tangencial
Agujero para ajuste de posición del motor del eje
A
B
C
D
VR4
VR5
6 5
VR2
VR3
Conmutador de límite interior
Tornillo de ajuste de posición del conmutador de límite interior
VR1
3 2 1
4

VR No.	
VR1:	RF LEVEL
VR2:	FOCUS OFFSET
VR3:	FOCUS GAIN
VR4:	TRKG BAL
VR5:	TRKG GAIN

FUNCIONES DE LAS TECLAS CUANDO SE ADJUNTA LA CPU DE PRUEBA


FOCS LOCK
FRAME SYNC LOCK
CRC CHECK OK
MEMORY
REPEAT
TRACK
ALL
A-B
PAUSE
DISPLAY
BINARY-54
PEAK-36
LEFT
RIGHT
TIME
INDEX
TOTAL
REMAIN
PROGRAM
TRACK
MIN
SEC
BINARY/PEAK LEVEL DISPLAY
PLAY
STOP
BINARY/PEAK/OFF
MEMORY REPEAT
A—B
PROGRAM RUN
TRACK SEARCH
TRACK MIN/INDEX SEARCH
STEP SLOW SCAN
FOCS OFF
FOCS ON
TRKG OPEN
TRKG CLOSE
SCAN REV
SCAN FWD
SLOW SCAN FWD
SLOW SCAN REV
STOP
SPDL ON
Sec.
Pista
Min.

No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste

INSTRUMENTOS Y DISPOSITIVOS QUE SE UTILIZAN

- Osciloscopio de doble oscilograma con barrido de retardo
- Medidor de energía luminosa
- Disco de prueba YEDS-7 y disco de demonstración
- Ajustador de FTG
- CPU de prueba
- Poste (para retención del ensamble del mecanismo)
- Destornillador de grating (reticulo)
- Destornillado de 2 ejes (para ajuste de ángulo de conexión de alambres

PRECAUCIONES

- Con el osciloscopio se debe utilizar una sonda de 1:1.
- Todas las fotos de forma de onda están en un osciloscopio de banda de 35 MHz.
- No se debe mirar a la lente del objetivo cuando está encendido el laser.
- A no ser que se especifique otra cosa, el TP está en el tablero SVCT.
- A no ser que se especifique otra cosa, el VR está en el tablero PREB.
- La altura del motor del eje se debe ajustar de antemano.
- Las especificaciones de ajuste aquí enumeradas suponen que se utiliza una CPU de prueba. Cuando se utiliza la CPU de prueba en lugar de la CPU estándar (PD3007), las funciones del reproductor difieren del modo siguiente:

Con CPU de prueba	Sin CPU de prueba
FOCUS ON, SPDL ON	–
FOCUS ON, SPDL ON (TRKG OPEN)	El SVCT TP3 se conecta a -5V cuando se inicia la reproducción
FOCUS ON, SPDL ON TRKG CLOSE	Reproducción en ON

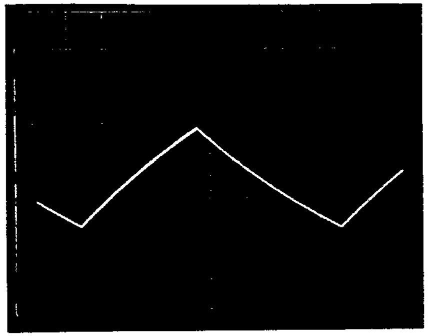
- Los pasos 4, 5, 6 y 7 se ejecutan con el bucle abierto de TRKG.
- Los pasos 8, 9, 10, 11, 12, 13 y 14 se ejecutan con el bucle cerrado de TRKG.

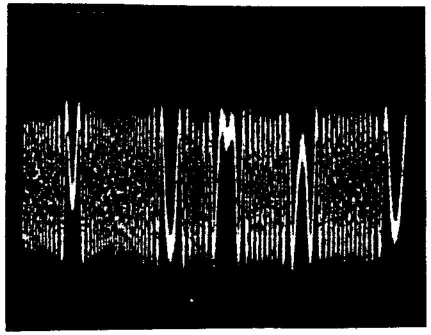
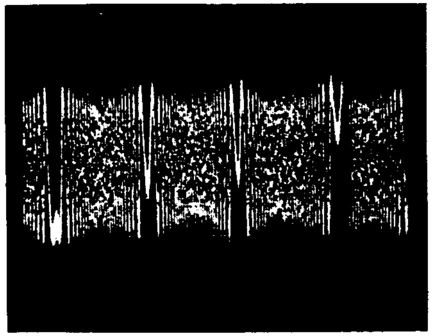
PREPARATIVOS

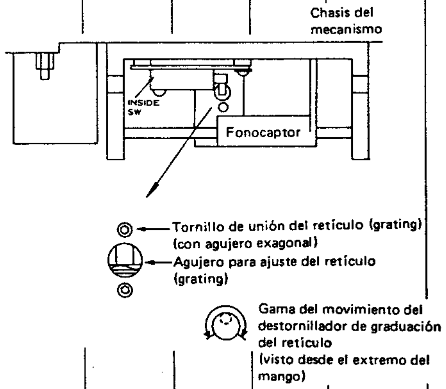
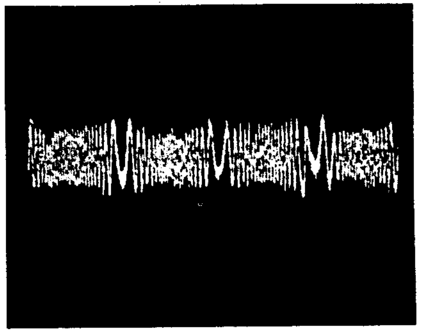
- Extraer la cubierta superior y elpanel inferior.
- Recambiar la CPU (Z8) en el SVCT por la CPU de prueba.
- Extraer los conectores entre el ensamble del medanismo PREB y el DCDR y SVCT.
- Extraer el mecanismo de la unidad (sacando las cuatro tuercas) y poner los cuatro postes en su lugar.
  Para más detalles, consultar el procedimiento que se da para extraer el ensamble del mecanismo.
- Volver a colocar los conectores como estaban antes. Síganse las direcciones que se dan el la gráfica de la izquierda y asegúrese de que todos y cada uno de los conectores están bien insertados.

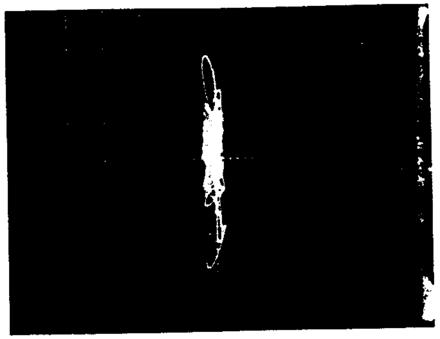
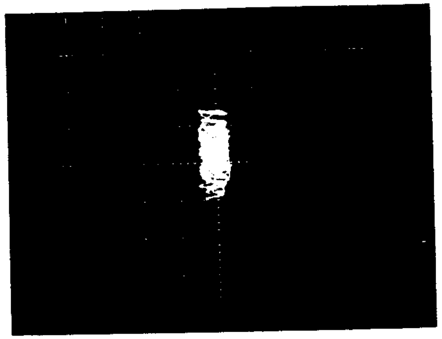
Ensamble del mecanismo
2P (Hilo cubierto blanco) ➡ DCDR N10
2P (Rojo, Negro : motor SPDL) ➡ DCDR N2
2P (Rojo, Negro : motor CARG) ➡ SVCT N3
2P (Amarillo, Negro: motor de CARGA) ➡ SVCT N4
2P (Verde, Rojo : SW INTERIOR) ➡ SVCT N5
2P (Azul, Negro : SW de PUERTA) ➡ SVCT N6
2P (Morado, Negro : SW de SUJECION) ➡ SVCT N7

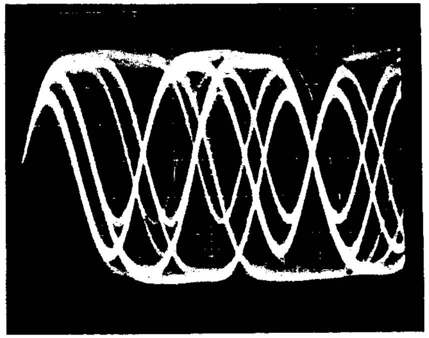
PREB
3P (Blanco, Negro, Marrón) ➡ SVCT N14
8P ➡ SVCT N15
4P ➡ SVCT N13

No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
			A no ser que se especifique otra cosa, el TP está en el SVCT	A no ser que se especifique otra cosa, el VR está en el PREB		**AJUSTES GENERALES**
1	0,1V/div	1mS/div	N13-2		(Retorno de F) 0V±100mV	**COMPROBACION DE LA TENSION DE RETORNO DE FOCO, TRKG (SEGUIMIENTO)** • Conectar la corriente y confirmar que la tensión de retorno de foco es 0V ± 100 mV y que la tensión de seguimiento de pista es 0V ± 10 mV.
	10mV/div		N13-4	SVCT	(Retorno de T) 0V±10mV	
				VR1		• Si no es aceptable la tensión de retorno de seguimiento de pista, hacer la debida corrección ajustando el SVCT VR1 (desvío de seguimiento de pista). • Si no es aceptable la tensión de retorno de foco, hay que comprobar el SVCT Z1, Z2, Q2 y Q3. **Nota:** Si la tensión de retorno no está dentro de la gama aceptqble, háganse rápidamente las debidas correcciones porque de lo contrario podría averiarse la bobina del servomotor.
	0,1V/div	1mS/div	N15-7	VR2	0V±0,1V	• Medir la tensión CC en N15-7. Si no es aceptable el resultado, hay que hacer la debida corrección con el VR2 de ajuste.
2	0,5V/div	0,2S/div	N13-2	–	Forma de onda en rampa	**COMPROBACION DE LA FORMA DE ONDA EN RAMPA** • Pulsar el botón FOCUS ON (►►I) y verificar que el objetivo sube y baja. (Forma de onda en rampa en N13-2) 
3	–	–	–	APCB VR1	0,26mW ±0,02mW	**COMPROBACION DE LA ENERGIA DE LD** • Colocar el sensor del medidor de la corriente luminosa directamente sobre el objetivo y verificar que es aceptable la corriente de LD. • Si no es aceptable la corriente, hay que hacer la debida corrección ajustando el VR del APCB.

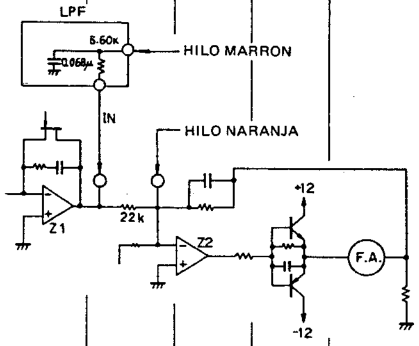
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
4						**COMPROBACION DE LOS CIERRES DE FOCO Y EJE** • Pulsar el botón de parada y cargar el disco de demonstración.
	1V/div	0,2S/div	N13-2		Forma de onda en rampa	• Pulsar el botón FOCUS ON (►►I) y verificar el ciclo de la forma de onda en rampa se genera en N13-2 y que se genera una tensión negativa en SVCT Z3 25 (cierre de foco).
	2V/div		SVCT Z3 25		FOCUS LOCK	• Pulsar el botón SPDL ON (►) y verificar que el disco gira y que el disco no comienza a girar fuera de control.
5	0,5V/div	5mS/div	TP-2	VR4 (TRKG BAL)	|A - B| < 0,1V	**BALANCE DE SEGUIMIENTO DE PISTA** • Medir el error de seguimiento en TP-2 y hacer el debido ajuste para eliminar cualquier elemento de CC.  ⇩ 

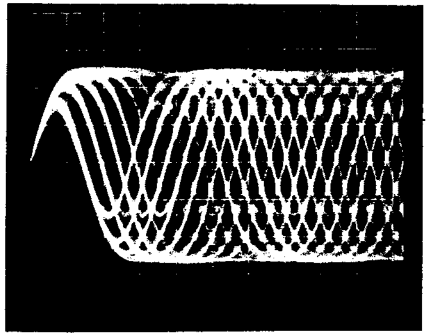
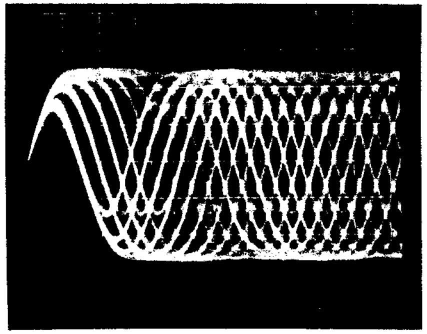
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
6						**AGUSTE DEL RETICULO (GRATING)** - Pulsar el botón SCAN FWD (▶>) para mover hacia arriba el borde exterior del disco y detener el fonocaptor en un punto donde el agujero de ajuste del retículo (grating) del fonocaptor esté un poco más allá del conmutador de límite interior.
	0,2V/div	5mS/div	TP-2	VR5	2,0Vp-p	- Ajustar aproximadamente el VR5 (ganancia de seguimiento de pista) de modo que el error de seguimiento sea 2,0Vp-p.
	0,2V/div	5mS/div	TP-2	VR4	|A − B| < 0,1V	- Verificar que no hay ningún elemento de CC en el error de seguimiento de pista. Si existe CC, hacer el ajuste preciso del VR4.
	0,2V/div	5mS/div	TP-2	Grating	Punto nulo grating	- Aflojar los tornillos de unión del retículo (grating). - Insertar el destornillador del retículo (grating) en el agujero del retículo con la sección de leva de la punta mirando hacia arriba. - Girar el destornillador de gradación del retículo al punto donde el error de sguimiento de pista esté a su mínimo nivel y la envoltura esté lo más limpia posible (punto nulo). Si fuera difícil hallar el punto nulo, comprobar insertando un filtro LPF (corte: 4 kHz) entre TP-2 y la sonda. **Nota:** El destornillador de graduación del retículo (grating) solamente se puede girar sobre una gama de unos 300°. No intentar girarlo a la fuerza más de esto.  Chasis del mecanismo INSIDE SW Fonocaptor Tornillo de unión del retículo (grating) (con agujero exagonal) Agujero para ajuste del retículo (grating) Gama del movimiento del destornillador de graduación del retículo (visto desde el extremo del mango) 
	0,2V/div	5mS/div	TP-2	Grating	Amplitud máxima	- Ahora gire hacia la derecha desde su posición actual el destornillado hasta el punto donde la amplitud de error de seguimiento está en punto más alto. - A la vez que se mide el error de seguimiento, apriete los tornillos de unión. Después de apretar los tornillos, verifique que la amplitud de error de seguimiento está todavía en su nivel máximo.

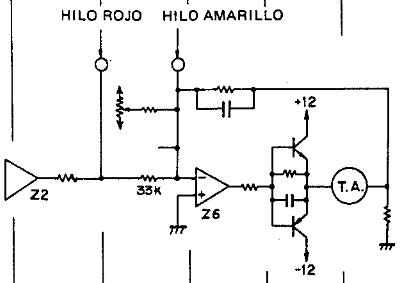
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
	X: 0,1V/div Y: 20mV/div		X: TP-2 Y: TP-1	Grating	Mínimo sobre el eje-Y	- Posicionar el osciloscopio en la modalidad X-Y, ejecutar la operación de acoplamiento y observar las formas de onda de Dissajous TRKG SUM y TRKG VAL. - Ajustar a precisión el retículo (grating) de modo que la amplitud de la forma de onda de Dissajous en la dirección vertical esté en sinel más bajo.
			X: TP-2 Y: TP-1	SPDL Retentor del motor	Mínimo sobre el eje-Y	- Seguidamente, pulsar el botón SCAN REV (<◀) para mover hacia el centro el disco hasta el punto justamente antes de que el fonocaptor choque contra el conmutador interior. - Compruebe la forma de onda de Dissajous. Si no es la misma que la forma de onda de Dissajous del borde exterior del disco, ajute la posición del motor del eje.  ⇩ 

No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
7	X: 0,1V/div Y: 20mV/div		X: TP-2 Y: TP-1	SPDL Agujero de ajuste de posición del motor del eje	Mínimo sobre el eje-Y	**AJUSTE DE POSICION DEL MOTOR DEL EJE** • Sacar el tornillo C de sujeción del motor del eje (punto de ajuste del mecanismo en la sección 3-1), e insertar el destornillador de ajuste de posición del motor en el agujero del tornillo. • Girar el destornillador hasta el punto en que la forma de onda de Dissajous esté en su nivel más bajo en la dirección vertical. • Comprobar las formas de onda de las pistas interior y exterior del disco. Si una de ellas cualquiera no está correctam repetir el ajuste de posición del motor del eje. • Una vez terminado el ajuste, reponga el tornillo y póngale el seguro del tornillo.
8	50mV/div	0,5µs/div	DCDR C1 ⊕		Aplane las puntas de la forma de onda de RF	**AJUSTE DE INCLINACION DEL MOTOR DEL EJE EN DIRECCION TANGENCIAL** • Pulsar los botones FOCUS ON (▶▶I), SPDL ON (▶) y TRKG CLOSE (▷▷I) en sucesión. • Ajustar aproximadamente el VR2 (FOCO DESCENTRADO) de modo que el patrón ocular de la forma de onda de RF esté en su nivel más alto.
			DCDR C1 ⊕	Perno exagonal de ajuste de ángulo	Patrón ocular máximo	• Girar el destornillador de 2 ejes hasta el punto donde la parte superior de los picos de la forma de onda de RF estén planos en las pistas más internas del disco. • Una vez terminado el ajuste, observar la forma de onda de RF para las pistas entre canciones en la sección central y exterior del disco para confirmar que los picos en estos lugares son también planos. 

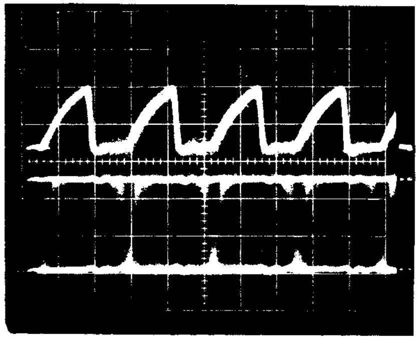
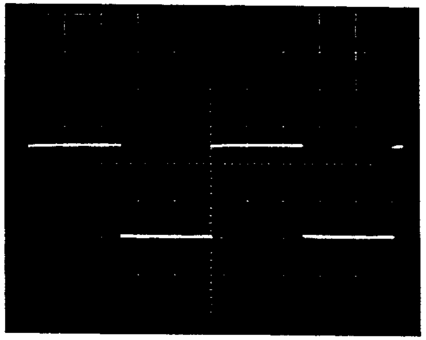
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
9					Pista 0 4 minuto 10 segundos	**AJUSTE DE POSICION DEL CONMUTADOR DE LIMITE INTERIOR** • Detener el reproductor y cargar el disco YEDS-7. • Pulsar el botón SCAN FWD (▶>) para mover hacia el borde exterior del disco el fonocaptor, luego pulsar el botón stop y esperar hasta que el fonocaptor deje de volver. Finalmente Pulsar los botones FOCUS ON (▶▶I) y TRKG C/L (▷▷I) en sucesión. • Confirmar que el visualizador lee pista 0, 4 minuto, 10 segundos ± 10 segundos. Si la presentación visual no es correcta, pulse el botón de parada "stop" y reajuste la posición del conmutador interior.
10	X: 10mV/div Y: 20mV/div		Z2 2 Z1 7	VR3	J-LED ON	**AJUSTE DE LA GANANCIA DE FOCO** • Ajustar la frecuencia del ajustador de FTG 500 Hz con el resistor variable VR1 ajustador de frecuencia. • Ajustar la ganacia del ajustador de FTG a 60 mVp-p con el resistor variable VR1 ajustador de ganancia. La salida del oscilador está disponible desde el alambre de color naranja posicionando en 1 el conmutador. • Conectar el alambre de color naranja del ajustador de FTG como se muestra en el diagrama. • Conectar el LPF (5,60 k/0,068µF) entre la salida de Z1 y el alambre de color marrón del ajustador de FTG. • Ajustar el resistor variable VR3 para iluminar el LED-J (JUST) en color verde. • Desconectar el ajustador de FTG.



No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
11	0,1V/div	0,5μs/div	DCDR C1 ⊕	VR2	Patrón máximo	**AJUSTE DE DESVIO DE FOCO** ● Observar la forma de onda de RF durante la pista segunda. ● Ajustar a precisión el VR2 (FUERA DE FOCO) de modo que la abertura del patrón ocular esté al máximo. 
	0,1V/div	0,5μs/div	N15-7	VR2	Dentro de ±0,1V	● Pulsar el botón "stop" y confirmar que la tensión CC en N15-7 es 0V ±0,1V. Si la tensión no está correcta, ajustar a precisión el VR2 para lograr ya sea +0,1V ó −0,1V, la que esté más próxima.
12	0,1V/div	0,5μs/div	DCDR C1 ⊕	VR1	0,5V±0,05V	**AJUSTE DE NIVEL DE RF** ● Observar la forma de onda de RF durante la segunda pista. ● Ajustar el VR1 (nivel de RF) de modo que la amplitud de la forma de onda de RF sea 0,5V ± 0,05V. 

No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
13	X: 20mV/div Y: 0,2V/div		Z6 ② Z2 ⑦	VR5	J-LED ON	**AJUSTE DE GANANCIA DE SEGUIMIENTO DE PISTA** ● Ajustar la frecuencia del ajustador de FTG a 1,35 kHz con el ajustador de frecuencia VR2. ● Ajustar la ganancia del ajustador FTG a 30 mVp-p con el ajustador de ganancia VR2. La salida del oscilador está disponible desde el alambre de color amarillo posicionando en 2 el conmutador. ● Conectar el alambre de color amarillo del ajustador de FTG como se muestra en el diagrama. ● Conectar el alambre de color rojo del ajustador de FTG como se muestra en el diagrama. ● Ajustar el resistor variable VR5 para iluminar el LED-J.  HILO ROJO HILO AMARILLO +12 Z2 33K Z6 T.A. -12

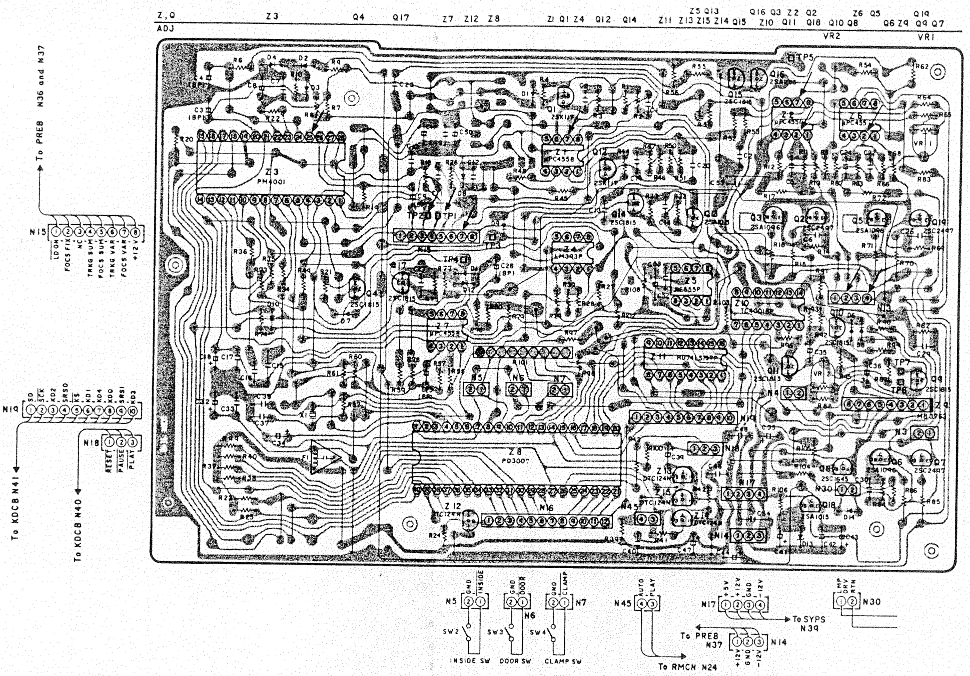
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
14	50mV/div	1mS/div	N13-2	SPDL Perno de ajuste de la altura del motor del eje	DC -200mV ±100mV	**CONFIRMACION DEL ANGULO RADIAL DEL MOTOR DEL EJE** • Ejecutar el acoplamiento de CC para el canal 1 del osciloscopio y el acoplamiento de CA para el canal 2, invertir la polaridad y posicionar en ADD los dos canales, el 1 y el 2. • Conectar ambos canales 1 y 2 a N13-2. • Comprobar la tensión CC en las pistas más internas y más externas del disco. Corregir el valor: -200 mV ± 100 mV. • La diferencia entre las dos tensiones CC obtenidas en el paso anterior no deberán ser más de 50 mV. • Si la direfeencia es mayor, reajustar la altura (ángulo) del motor del eje. Después de completados todos los pasos mencionados: • Cambiar la CPU de prueba por la original PD3007. • Cambiar el ensamble del mecanismo en el reproductor.

No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
	2V/div 2V/div	0,1 µs/div	DCDR Z3 12 (PLCK) Z3 14 (EFM2)	DCDR VR1	Consultar la foto	**PANEL DCER** **PLL FUERA DE FASE** • Cargar el disco de prueba YEDS-7 y pulsar el botón "play". • Observar las formas de onda de PLCK y EFM2. (Aplicar el disparador para PLCK.) (La foto de la parte superior muestra la forma de onda de PLCK y la foto de la parte inferior muestra la EFM2.) • Alinear el borde de elevación del PLCK con el dispositivo posicionador de EFM2. 
	2V/div	20 µs/div	DCDR Z1 19 (APCO)	DCDR VR2	Duty 50%	**SPDL FUERA DE FASE** • Observar APCO y hacer el ajuste de modo que la relación de trabajo sea 50%. 

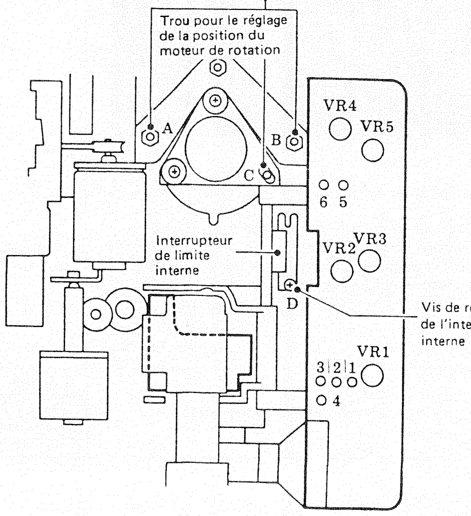
No. de paso	Gama del osciloscopio		Punto de prueba	Punto de ajuste	Especificaciones para los puntos de comprobación /ajuste	Procedimiento a seguir al hacer el ajuste
				VR3		**AJUSTE DE PULSO DE FRENO** • Cargar el disco de demonstración y pulsar el botón "play". • Pulsar el botón "stop" mientras se está reproduciendo la primera pista y medir el tiempo requerido para que el disco se pare completamente por sí mismo en la dirección hacia la drecha. • Pulsar el botón "stop" mientras se está reproduciendo la última pista y medir el tiempo que se requiere para que el disco se pare completamente por sí mismo en dirección hacia la izquierda. • El tiempo de parada se deberá ser más o menos el mismo que para las pistas primera y última. • Si los tiempos de parada difieren notablemente, ajustar el VR3.
	2V/div	1mS/div	DCDR R42//C17	VL1	5V±0,2V	**AJUSTE DEL VCO** • Mientras se está reproducciendo un disco, medir la tensión de CC en el punto entre DCDR R42 y C17 para confirmar que es 5V ± 0,2V. • Si la tensión no es aceptable, ajustar el VL1.
			SVCT TP-7 TP-6	SVCT VR2	0,3±0,05V	**PANEL SVCT** **AJUSTE DE PARADA DE CARGA** • Pulsar el botón OPEN/CLOSE para que el disco salte a fuera. • Pulsar nuevamente el botón OPEN/CLOSE y, mientras el motor de carga está en marcha (a la vez que el giradiscos está cerrando), ajustar el VR2 de modo que la caída de la tensión entre TP-7 y TP-6 sea 0,3 V ± 0,05 V. • Después de acabar los ajustes, bloquear el movimiento de carga del giradiscos (cuando el plato se mueve hacia adentro) y verificar que el motor de la carga deja de rotar.
	10mV/div 10mV/div	1mS/div 1mS/div	AUDF TP-1 TP-2	AUDF VR1 VR2	0V±10mV 0V±10mV	**PANEL AUDF** **AJUSTE DE DESCENTRAMIENTO** • Conectar la corriente y hacer el ajuste de modo que la tensión CC en TP-1 sea 0V ± 10 mV. • Hacer el ajuste de modo que la tensión CC en TP-2 sea 0V ± 10 mV.

9. REGLAGES ELECTRIQUES

SCHEMA DES FIGURES DU SVCT

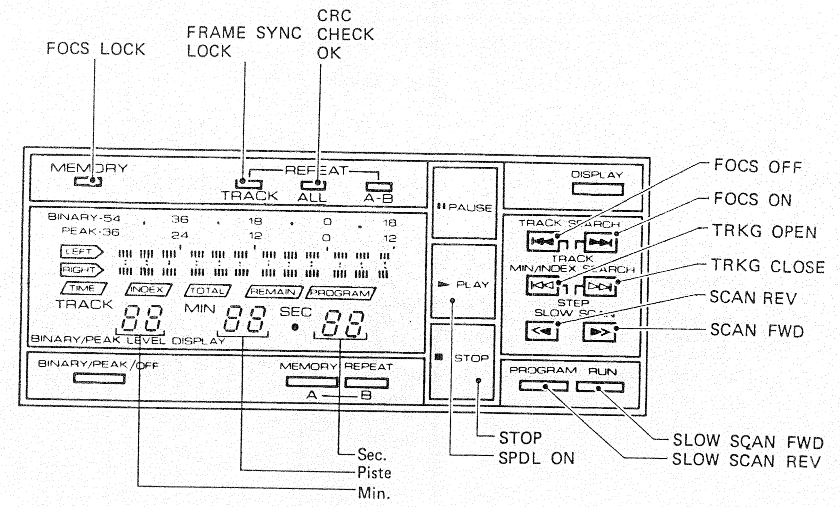

Z,0
ADJ
Z3
Q4
Q17
Z7 Z12 Z8
ZI Q1 Z4 Q12 Q14
Z11 Z13 Z15 Z14 Q15
Z5 Q13
Q16 Q3 Z2 Q2
Z10 Q11 Q18 Q10 Q8
Z6 Q5
Q6 Z9 Q9 Q7
Q19
VR2
VR1
To PREB N36 and N37
N15
N19
N18
To KDCB N41
To KDCB N40
N5
N6
N7
SW2
SW3
SW4
INSIDE SW
DOOR SW
CLAMP SW
N45
N17
To SYPS N39
To PREB N37
N14
To RMCN N24
N30
Z3 PM4001
Z8 PD3007

POINTS DE REGLAGE DU MECANISME ET DE PREB


Vis de réglage (hexagonale) pour l'inclinaison tangentielle
Trou pour le réglage de la position du moteur de rotation
A
B
C
D
VR4
VR5
6 5
VR2
VR3
Interrupteur de limite interne
VR1
3 2 1
4
Vis de réglage de la position de l'interrupteur de limite interne

VR No.	
VR1:	RF LEVEL
VR2:	FOCUS OFFSET
VR3:	FOCUS GAIN
VR4:	TRKG BAL
VR5:	TRKG GAIN

FONCTIONS CLES LORS DE L'UTILISATION D'UN CPU DE TEST


FOCS LOCK
FRAME SYNC LOCK
CRC CHECK OK
MEMORY
REPEAT
TRACK
ALL
A-B
PAUSE
DISPLAY
BINARY-54
PEAK-36
LEFT
RIGHT
TIME
INDEX
TOTAL
REMAIN
PROGRAM
TRACK
MIN
SEC
BINARY/PEAK LEVEL DISPLAY
TRACK SEARCH
TRACK MIN/INDEX SEARCH
STEP SLOW SCAN
PLAY
STOP
BINARY/PEAK/OFF
MEMORY REPEAT
A — B
PROGRAM
RUN
FOCS OFF
FOCS ON
TRKG OPEN
TRKG CLOSE
SCAN REV
SCAN FWD
STOP
SPDL ON
SLOW SCAN FWD
SLOW SCAN REV
Sec.
Piste
Min.

No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit

Ensemble des mécanismes

2P (Fil blindé blanc)		DCDR N10
2P (Rouge, noir :	Moteur SPDL)	DCDR N2
2P (Rouge, noir :	Moteur CARG)	SVCT N3
2P (Jaune, noir :	Moteur LOAD)	SVCT N4
2P (Vert, rouge :	Contacteur interne)	SVCT N5
2P (Bleu, noir :	Contacteur de porte)	SVCT N6
2P (Violet, noir :	Contacteur de griffe)	SVCT N7

PREB

3P (Blanc, noir, brun)	SVCT N14
8P	SVCT N15
4P	SVCT N13

INSTRUMENTS ET APPAREILS UTILISES

- Oscilloscope double trace avec ligne à retard
- Un appareil de mesure de la puissance lumineuse
- Le disque d'essai YEDS-7 et le disque de démonstration
- Commande de réglage FTG
- Une unité centrale (CPU) de test
- Un support pour le maintien du mécanisme
- Un tournevis pour le réglage de la cible
- Un tournevis double pour le réglage de l'angle de liaison du câble.

PRECAUTIONS

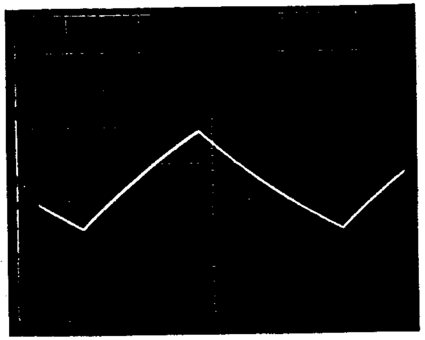
- Utiliser une sonde 1:1 avec l'oscilloscope.
- Toutes les photos de courbe oscilloscope ont été prises avec un oscilloscope 35 MHz.
- Sauf indication contraire les points de test TP sont sur SVCT.
- Sauf indication contraire les résistances VR sont sur PREB.
- Effectuer au préalable le réglage de la hauteur du moteur de rotation.
- Les spécifications de réglage indiquées ici supposent l'utilisation d'une unité centrale (CPU) de test. Si une unité centrale de test est utilisée à la place de l'unité centrale standard (PD3007) les fonctions de l'appareil diffèrent comme suit:

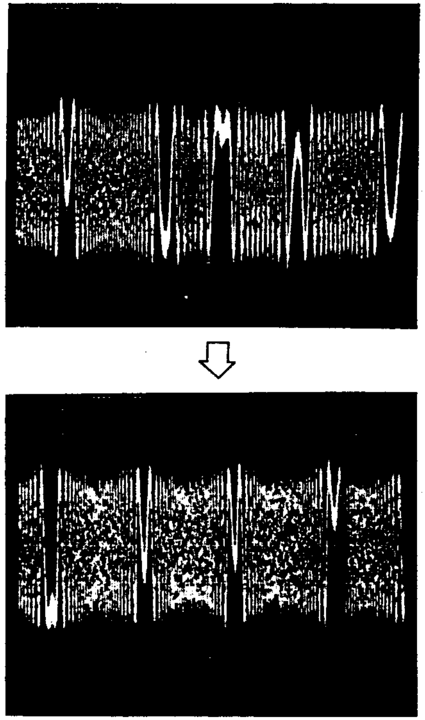
Avec CPU de test	Sans CPU de test
FOCUS ON, SPDL ON	–
FOCUS ON, SPDL ON (TRKG OPEN)	TP3 de SVCT est relié au -5V quand l'appareil fonctionne
FOCUS ON, SPDL ON TRKG CLOSE	Lecture

- Les étapes 4, 5, 6 et 7 doivent être réalisées en boucle d'asservissement (TRKG) ouverte.
- Les étapes 8, 9, 10, 11, 12 et 13 doivent être réalisées en boucle (TRKG) fermée.

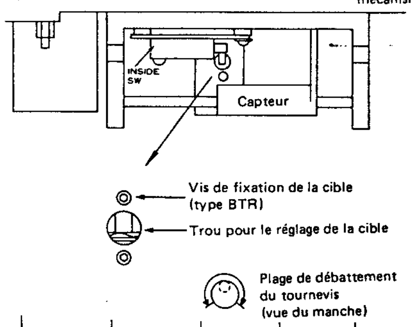
OPERATIONS PREPARATOIRES

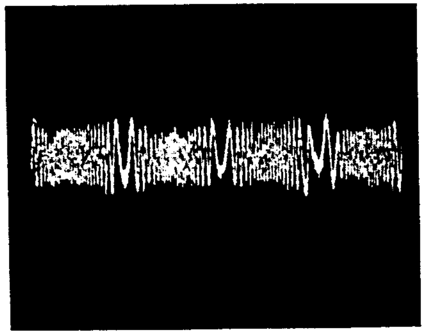
- Enlever les couvercles supérieur et iférieur.
- Remplacer l'unité centrale Z8 sur SVCT par l'unité centrale de test.
- Retirer le mécanisme de l'appareil (enlever les quatre écrous) et installer les quatre supports à la place. Se reporter pour cela aux indications relatives à la dépose du mécanisme.
- Rebrancher les connecteurs. Suivre les indications fournies dans le tableau de gauche et s'assurer que les connecteurs sont bien enfoncés.

No. d'opé-ration	Gamme de réglage de l'oscilloscope		Compo-sant de mesure	Compo-sant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
			Sauf indication contraire les points de test TP sont sur SVCT	Sauf indication contraire les points de test VR sont sur PREB		**REGLAGES PRINCIPAUX**
1	0,1V/div 10mV/div	1mS/div	N13-2 N13-4	SVCT VR1	(Retour F) 0V±100mV (Retour T) 0V±10mV	**VERIFICATIONS DES TENSIONS DE RETOUR MISE AU POINT (FOCUS) ET BOUCLE D'ASSERVISSEMENT (TRKG)** • Mettre sous tension et vérifier que la tension de retour mise au point est égale à 0V ± 100mV et que la tension de retour de la boucle est égale à 0V ± 100mV. • Si le tension de retour de la boucle diffère de la valeur indiquée, la régler en agissant sur VR1 de SVCT (écart d'asservissement). • Si la tension de retour de mise au point diffère de la valeur indiquée, vérifier Z1, Z2, Q2 et Q3 sur SVCT. **Note:** Si la tension de retour n'est pas dans les limites indiquées apporter, sans retard, les corrections voulues car la bobine du système d'entrainement pourrait, autrement, être endommagée.
	0,1V/div	1mS/div	N15-7	VR2	0V±0,1V	• Mesurer la tension continue sur N15-7. Si elle n'a pas la valeur voulue, agir sur VR2.
2	0,5V/div	0,2S/div	N13-2	–	Courbe de la rampe	**VERIFICATION DE L'ALLURE DE LA COURBE DE LA RAMPE** • Appuyer sur la commande de mise au point (FOCUS ON (▶▶|) et vérifier qu'il y a bien déplacement des lentilles de l'objectif. (Courbe de la rampe sur N13-2.) 
3	–	–	–	APCB VR1	0,26mW ±0,02mW	**VERIFICATION DE LA PUISSANCE DU LASER** • Placer l'appareil de mesure de la puissance lumineuse directement au-dessus des lentilles de l'objectif et vérifier que la puissance du laser est correcte. • Si cette puissance n'a pas la valeur voulue agir sur la résistance variable de APCB.

No. d'opé-ration	Gamme de réglage de l'oscilloscope		Compo-sant de mesure	Compo-sant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
4	1V/div 2V/div	0,2S/div	N13-2 SVCT Z3 25		Courbe de la rampe FOCUS LOCK	**VERIFICATION DU VEROUILLAGE DE LA MISE AU POINT ET DE LA ROTATION** • Appuyer sur le bouton d'arrêt et mettre en place le disque de démonstration. • Appuyer sur la commande de mise au point (FOCUS ON (▶▶|) et vérifier la présence sur N13-2 d'une courbe de rampe, et d'une tension négative sur Z3 de SVCT 25 (vérouillage de la mise au point). • Appuyer sur la commande de rotation (SPDL ON (▶) et vérifier que le disque tourne normalement.
5	0,5V/div	5mS/div	TP-2	VR4 (TRKG BAL)	|A - B| < 0,1V	**EQUILIBRAGE DE LA BOUCLE D'ASSERVISSEMENT** • Mesurer l'erreur d'asservissement sur le point de test TP-2. Régler en sorte d'éliminer toute valeur de courant continu. 

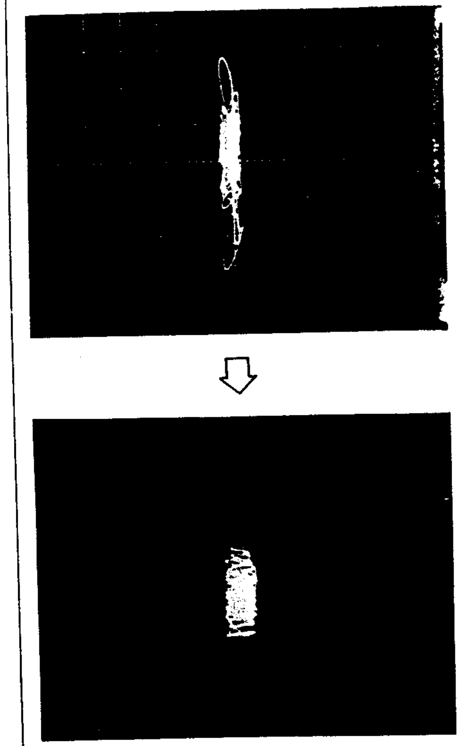
No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
6						**REGLAGE DE LA CIBLE** • Appuyer sur la commande de balayage (SCAN FWD (▶>) de sorte que le capteur se déplace vers le bord extérieur du disque et arrêter le capteur au moment où le trou de réglage de la ciable se trouve légèrement au-delà de l'interrupteur de limite intérieure.
	0,2V/div	5mS/div	TP-2	VR5	2,0Vp-p	• Régler grossièrement VR5 (gain de la boucle) de sorte que l'erreur d'asservissement soit de 2,0V crête à crête.
	0,2V/div	5mS/div	TP-2	VR4	|A – B| < 0,1V	• Vérifier qu'iln'y a pas de composante continue dans le courant d'erreur d'asservissement. Si ce n'est pas le cas, procéder à un réglage de VR4.
						• Desserrer les vis de fixation de la cible.
	0,2V/div	5mS/div	TP-2	Filtre	Point d'équilibre	• Insérer le tournevis spécial dans le trou prévu pour le réglage de la cible, la partie où se trouve la came étant dirigée vers le haut.
					Chassis du mécanisme	• Tourner le tournevis pour minimiser l'erreur sur la boucle d'asservissement et rendre la courbe enveloppe aussi nette que possible (point zéro). En cas de difficultés pour trouver ce point zéro, mettre en place une LPF (coupure à 4 kHz environ) entre TP-2 et la sonde. **Note:** Le tournevis de réglage ne peut être tourné que sur 300° environ. Ne pas essayer d'aller au-delà de cette valeur.

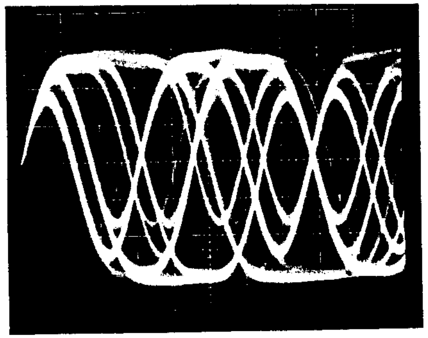

INSIDE SW
Capteur
Vis de fixation de la cible (type BTR)
Trou pour le réglage de la cible
Plage de débattement du tournevis (vue du manche)



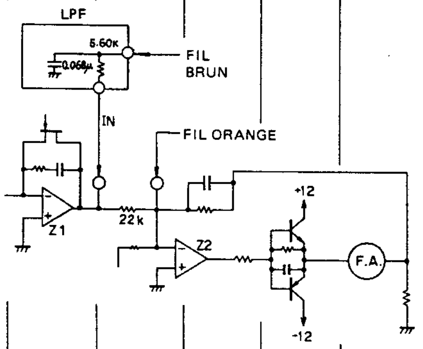
No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
	0,2V/div	5mS/div	TP-2	Filtre	Amplitude maximum	• Tourner maintenant le tournevis dans le sens des aiguilles d'une montre jusqu'à ce que l'amplitude de l'erreur d'asservissement devienne maximum. • Durant cette opération resserrer les vis de fixation. Cela fait, vérifier que le niveau de l'erreur d'asservissement est toujours maximum.

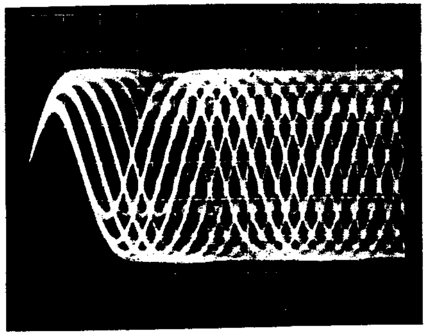
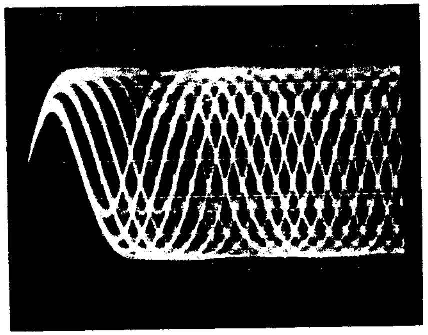
No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
	X: 0,1V/div Y: 20mV/div		X: TP-2 Y: TP-1	Filtre	Min. sur l'axe Y	• Régler l'oscilloscope en mode X-Y, établir le couplage en AC et observer les figures de Lissajous (TRKG SUM et TRKG VAL). • Procéder au réglage fin de la cible en sorte que l'amplitude verticale des figures de Lissajous soit minimum.
			X: TP-2 Y: TP-1	SPDL Support moteur	Min. sur l'axe Y	• Appuyer sur la commande de balayge (SCAN REV (<◀) de sorte que le capteur se déplace vers le centre du disque jusqu'au moment où il est prêt à toucher l'interrupteur intérieur. • Comparer la figure de Lissajous obtenue à ce moment là avec celle obtenue lorsque le capteur se trouvait à la périphérie du disque. Si ces figures ne sont pas identiques, procéder au réglage de la position du moteur de rotation.



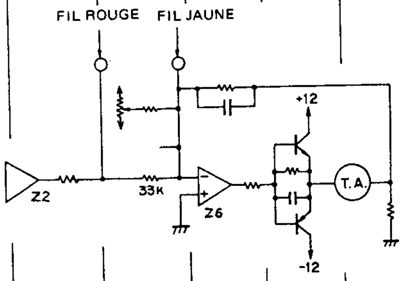
No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
7	X: 0,1V/div Y: 20mV/div		X: TP-2 Y: TP-1	SPDL Trou pour le réglage du moteur de rotation	Min. sur l'axe Y	**REGLAGE DE LA POSITION DU MOTEUR DE ROTATION** • Enlever l'écrou C de fixation du moteur de rotation (réglage du mécanisme, chapitre 3-1) et insérer le tournevis de réglage de la position du moteur de rotation dans le trou de la vis. • Tourner le tournevis jusqu'à ce que l'amplitude verticale de la figure de Lissajous soit minimum. • Vérifier la forme des courbes pour les pistes extérieure et intérieure du disque. Si les courbes ne sont pas correctes procéder à un nouveau réglage de la position du moteur de rotation. • Une fois le réglage terminé, remettre la vis en place et appliquer du vernis de blocage.
8	50mV/div	0,5µs/div	DCDR C1 ⊕ DCDR C1 ⊕	Ecrou hexagonal de réglage d'angle	Aplatir les sommets de la courbe HF Figure d'oeil maximum	**REGLAGE DE L'INCLINAISON DU MOTEUR DE ROTATION DANS LA DIRECTION TANGENTIELLE** • Appuyer sur le bouton d'arrêt et fixer le tournevis à deux axes. • Appuyer sur les commandes de mise au point (FOCUS ON (▶▶|), de rotation (SPDL ON (▶) et de fermeture de la boucle d'asservissement (TRKG CLOSE (▷▷|). Procéder dans l'ordre indiqué. • Régler grossièrement VR2 (FOCUS OFFSET) pour obtenir un niveau maximum de la figure d'oeil HF. • Tourner le tournevis à deux axes jusqu'au moment où les sommet de la courbe HF sont plats et ce pour les pistes du disque situées près du centre. • Une fois le réglage terminé, s'assurer que les sommets des courbes HF pour les pistes intermédiaires, au centre et à la périphérie du disque, sont, eux aussi, plats. 

No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
9				Contacteur interne SW	Piste 0 4 min. 10 sec.	**REGLAGE DE L'INTERRUPTEUR DE LIMITE INTERIEURE** • Arrêter l'appareil et mettre en place le disque de test YEDS-7. • Appuyer sur la commande de balayage (SCAN FWD (▶>) et déplacer le capteur vers le bord du disque. Appuyer alors sur le bouton d'arrêt et attendre que le capteur ait terminé son mouvement de retour. Enfin, appuyer, dans l'ordre, sur les commandes FOCUS ON (▶▶|), SPDL ON (▶) et TRKG C/L (▷▷|). • Vérifier que l'affichage indique bien: piste 0, 1 min. 30 sec. ±10 sec. Si ce n'est pas le cas, appuyer sur le bouton d'arrêt et procéder à un nouveau réglage de la position de l'interrupteur de limite intérieure.
10	X: 10mV/div Y: 20mV/div		Z2 2 Z1 7	VR3	J-LED ON	**REGLAGE DU GAIN DE MISE AU POINT** • Régler la fréquence de la commande de réglage FTG sur 500 Hz à l'aide de VR1 (fréquence). • Régler le gain de la commande de réglage FTG à 60 mV crête à crête, à l'aide de VR1 (gain). La sortie de l'oscillateur est disponible sur le fil orange lorsque le commutateur est sur la position 1. • Relier le fil orange de la commande de réglage FTG comme indiqué sur le schéma. • Relier une LPF (5,60 k/0,068 µF) entre la sortie de Z1 et le fil marron de la commande de réglage FTG. • Régler VR3 de sorte que la diode électroluminescente (LED) verte s'éclaire (JUST). • Débrancher la commande de réglage FTG.

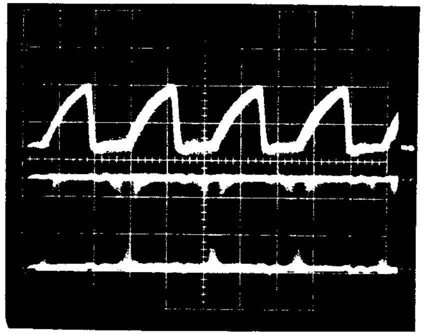
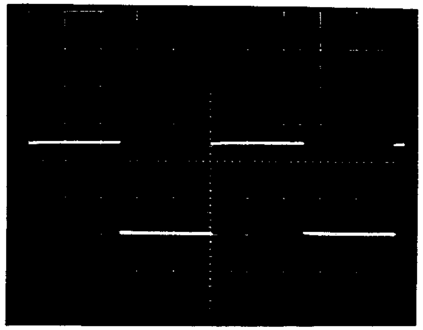


No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
11	0,1V/div	0,5μs/div	DCDR C1 ⊕	VR2	Figure d'oeil maximum	**REGLAGE DE L'ECART DE MISE AU POINT** • Observer la forme de la courbe HF sur la deuxième piste. • Procéder au réglage fin de VR2 (FOCUS OFFSET) de sorte que l'ouverture de la figure d'oeil soit à son maximum. 
	0,1V/div	0,5μs/div	N15-7	VR2	Entre ±0,1V	• Appuyer sur le bouton d'arrêt et vérifier que la tension continue sur N15-7 est égale à 0V ±0,1V. Si ce n'est pas le cas, procéder à un nouveau réglage de VR2 pour amener cette tension à +0,1V ou −0,1V suivant celle de ces deux valeurs qui est la plus proche.
12	0,1V/div	0,5μs/div	DCDR C1 ⊕	VR1	0,5V±0,05V	**REGLAGE DU NIVEAU HF** • Observer la forme de la courbe HF sur la deuxième piste. • Régler VR1 (niveau HF) de sorte que l'amplitude du signal HF soit égale à 0,5V ±0,05V. 

No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
13	X: 20mV/div Y: 0,2V/div		Z6 ② Z2 ⑦	VR5	J-LED ON	**REGLAGE DU GAIN DE LA BOUCLE D'ASSERVISSEMENT** • Régler la fréquence de la commande de réglage FTG sur 1.35kHz au moyen de VR2 (frequence). • Régler le gain de la commande de réglage FTG à 30mV crête à crête à l'aide de VR2 (gain). La sortie de l'oscillateur est disponible sur le fil jaune lorsque le commutateur est sur la position 2. • Relier le fil jaune de la commande de réglage FTG comme indiqué sur le schéma. • Relier le fil rouge de la commande de réglage FTG comme indiqué sur le schéma. • Régler VR5 de sorte que la diode électroluminescente (J-LED) s'éclaire.



No. d'opération	Gamme de réglage de l'oscilloscope	Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
14	50mV/div 1mS/div	N13-2	SPDL Vis de réglage de la hauteur du moteur de rotation	DC -200mV ±100mV	**VERIFICATION DE L'ANGLE RADIAL DU MOTEUR DE ROTATION** • Effectuer les liaisons en courant continu pour la voie 1 de l'oscilloscope et en courant alternatif pour la voie 2. Inverser la polarité et régler les deux voies sur ADD. • Relier les deux voies à N13-2. • Vérifier la tension continue pour les pistes intérieure et extérieure du disque. La valeur correcte est: -200 mV ± 100 mV • La différence entre les deux tensions obtenues à l'étape précédente ne doit pas être supérieure à 50 mV. • Si ce n'est pas le cas, procéder à un nouveau réglage de la hauteur du moteur de rotation (angle). Après avoir effectué toutes les étapes décrites ci-dessus: • Remplacer l'unité centrale de test par l'unité PD3007. • Remettre en place le mécanisme dans l'appareil.

No. d'opération	Gamme de réglage de l'oscilloscope		Composant de mesure	Composant de réglage	Points de contrôle/ Caractéristiques de réglage	Réglage proprement dit
						PANNEAU DCDR **ECART PLL** • Mettre en place le disque d'essai YEDS-7 et appuyer sur le bouton de mise en route. • Observer la forme des courbes PLCK et EFM2.((Mettre la commande pour PLCK.) (La photo supérieure représente la courbe PLCK, la photo inférieure la courbe EFM2.) • Aligner la partie ascendante de PLCK avec le marquer de EFM2. 
	2V/div 2V/div	0,1 μs/div	DCDR Z3 12 (PLCK) Z3 14 (EMF2)	DCDR VR1	Voir photo	
	2V/div	20 μs/div	DCDR Z1 19 (APCO)	DCDR VR2	Duty 50%	**ECART SPDL** • Observer APCO et régler pour que rapport de service soit égal à 50%. 

No. d'opé-ration	Gamme de réglage de l'oscilloscope		Compo-sant de mesure	Compo-sant de réglage	Points de contrôle/ Caractéristi-ques de réglage	Réglage proprement dit
				VR3		**REGLAGE DU FREIN** • Mettre en place le disque de démonstration et appuyer sur le bouton de mise en route. • Appuyer sur le bouton d'arrêt pendant la lecture de la première piste. Mesurer le temps mis par le disque pour parvenir seul à l'arrêt complet (sens des aiguilles d'une montre). • Lire la dernière piste et appuyer sur le bouton d'arrêt. Mesurer le temps mis par le disque pour parvenir seul à l'arrêt complet (sens inverse des aiguilles d'une montre). • Ces temps doivent être à peu près les mêmes. • Si ce n'est pas le cas, procéder au réglage de VR3.
	2V/div	1mS/div	DCDR R42//C17	VL1	5V±0,2V	**REGLAGE DU VCO** • Pendant la lecture d'un disque, procéder à la mesure de la tension continue entre R42 et C17 de DCDR et vérifier que la valeur obtenue est égale à 5V ± 0,2V. • Si ce n'est pas le cas, régler VL1.
			SVCT TP-2 TP-6	SVCT VR2	0,3±0,05V	**PANNEAU SVCT** **REGLAGE DE L'ARRET DE CHARGEMENT** • Appuyer sur le bouton OPEN/CLOSE pour éjecter le disque. • Appuyer à nouveau sur le bouton OPEN/CLOSE et pendant que le moteur de chargement tourne (c'est-à-dire pendant que le porte-disque se ferme) régler VR2 de sorte que la chute de tension entre TP-6 et TP-7 soit égale à 0,3V ± 0,05V. • Cela fait, empêcher le mouvement du porte-disque vers l'intérieur et vérifier que le moteur de chargement s'arrête.
	10mV/div 10mV/div	1mS/div 1mS/div	AUDF TP-1 TP-2	AUDF VR1 VR2	0V±10mV 0V±10mV	**PANNEAU AUDF** **REGLAGE DE L'ECART** • Metre sous tension et régler pour obtenir une tension continue de 0V ± 10 mV sur le point de test TP-1. • Régler pour obtenir une tension continue identique sur le point de test TP-2.

10. SPECIFICATIONS

1. General

System	Compact Disc digital audio system
Disc	Diameter: 120 mm
	Thickness: 1.2 mm
	Max. playing time: over 60 minutes (stereo)
	Linear speed: 1.2 ~1.4 m/sec
	Direction of rotation (signal encoded side): Counterclockwise
Signal format	Sampling frequency: 44. 1 kHz
	Quantization bits: 16 bits, linear
	Transmission bit rate: 4.3218 Mbits/sec
	Modulation system: EFM
	Error correction system: CIRC
	Pre-emphasis: 50/15 μ sec
Laser	Semiconductor laser, wavelength 780 nm
Power requirements	
HE, HB, HP, models	220, 240 V AC (switchable), 50/60 Hz
S model	110, 120, 220, 240 V AC (switchable), 50/60 Hz
KU model	120 V AC, 60 Hz
Power consumption	38 W
Operating temperature	+5°C~+35°C
Weight	7.5 kg (16.6 lbs)
Dimensions	420 (W) x 300 (D) x 98 (H) mm
	16-1/2 (W) x 11-7/8 (D) x 3-7/8 (H) in

2. Audio Characteristics

Frequency response	5 Hz to 20 kHz ±0.5 dB
S/N(signal-to-noise ratio)	More than 95 dB (1 kHz)
Dynamic range	More than 95 dB (1 kHz)
Channel separation	More than 90 dB (1 kHz)
Wow and Flutter	Quartz oscillator accuracy
Total harmonic distortion	Less than 0.004 % (1 kHz, 0 dB)
Output voltage	200 mVrms (1 kHz, −20 dB)
Headphones output	36 mW (32 Ω)
Channels	2 channels (stereo)

3. Functions

- Play
- Pause
- Slow scan
- Track search
- Min/index search
- Memory stop
- Memory (A-B) repeat
- Track repeat
- All repeat
- Program disc play
- Program repeat play

4. Accessories

• Audio connecting cords with pin plugs	1
• Operating Instructions	1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.